Subject Index to Volume 28

Acclimatization
altitude, protection against lung damage from hyperoxia, 474
heat, tilt tolerance, 428
hypoxia, 826, 832, 836
Acetazolamide, color sensitivity zones in visual field, 741
Acid-base balance during exercise in newcomers to high altitude, 151
Adrenal gland
acute cold exposure, 543
equilibration of cholesterol in plasma and, 42
function during exercise in newcomers to high altitude, 151
Aging
airway closure, 448
responses to work in heat, 50
thoracoabdominal mechanics, 457
Airway
effect of hypoxia on smooth muscle mechanics and electrophysiology, 630
effects of O_2 and CO_2 on smooth muscle after pulmonary vascular occlusion, 570
Airway closure, aging and posture, 448
Airway conductance, exercise, 138
Airflow, nasal, in various body positions, 162
Albumin degradation at high altitude, 728
Altitude, thorax resistivity, 75
Altitude, high
degradation of albumin and IgG, 728
exercise, acid-base balance, and adrenal function in newcomers to, 151
liver function and blood flow, 725
plasma volume and cell mass in polycythemia, 775
Alveolar volume, external support of excised lungs, 133
Anesthesia, hemorrhage tolerance, 178
Aorta
dynamic elasticity in radial direction, 578
thoracic, pressure dynamics during linear deceleration, 23
Apparatus: *see* Methods and instrumentation
Arteries
plethysmographic in vivo determinations of elastic properties, 328
pulmonary, responses to hypoxia of strips in nonaqueous baths, 566
Atelectasis, pulmonary blood flow and resistance, 609
Axon reflex responses in familial dysautonomia, 790

Ballistogram, electrostatic, 89
Bile, liver secretion, 495
Biodynamics in thoracic aorta during linear deceleration, 23
Blood, resting levels of fibrinolysis in resting and exercising men, 549
Blood flow
effect of sodium balance on intrarenal distribution, 312
hepatic, high altitude, 725
measurement with indocyanine green, 190
prosthetic valves, 282
pulmonary capillary, waves in subjects with abnormal pulmonary hemodynamics, 793
redistribution during sustained high skin temperature in resting man, 415
renal, plasma disappearance of iodopyracet, 79
resting and postexercise, effect of normo- and hyperbaric oxygen, 275
through renal cortex effect of hemorrhage, 583
total and regional, effect of training, 397
Blood flow, pulmonary
atelectasis, 609
body position, 303
extravascular lung water, 166
Blood gas, arterial, changes induced by pursed lips breathing, 784
Blood gas tension in two species of unanesthetized monkeys, 108
Blood loss, single-label blood volume measurement before and after corrected, 213
Blood pressure
increase with muscle contraction, 758
pericardial, posture, 622
pulmonary artery, exercise diffusing capacity, 461
transpulmonary and vascular, effects on pulmonary blood volume, 553
Blood transfusion, continuous cross, between unrestrained rats, 383
Blood volume
intravascular, endotoxin shock, 156
pulmonary, effects of transpulmonary and vascular pressures, 553
single-label measurement before and after corrected blood loss, 213
Body density, nomograms for prediction of, from skinfold measurements, 221
Body water determination by D_2O dilution using saliva samples and gas chromatography, 354
Bradycardia, diving, relation to fitness, 614
Brain
live, scanning interior of, by impedography, 534
tissue reoxygenation time, 387
Brain stem, respiratory sensitivity of surface of, to chemical stimuli, 721
Breathing, pursed lips, ventilation and arterial blood gas changes induced by, 784

Carbohydrates, tissue, effect of prolonged centrifugation on, in fasted rats, 771
Carbon dioxide
effect on oxygen uptake in hyperventilation, 8
effects on airway smooth muscle after pulmonary vascular occlusion, 570
rebreathing method to determine cardiac output, 337
response to hemorrhage while breathing, 465
Carbon dioxide tension, inspired, effect on response to exercise, 663
Cardiac output
computer computation with gamma function, 219
CO_2 rebreathing method to determine, 337
measurement with nitrous oxide, 863
transient response to supine exercise, 183
Cardiac pacing, remote switching to selected sites of variable-frequency, 855
Cardiorespiratory responses to exercise at 1000-ft depth, 34
Catheterization, anterior femoral, 117
Centrifugation, prolonged, effect on tissue carbohydrate in fasted rats, 771
Cerebrospinal fluid pressure measurement, 872
Cerebrum, electrical activity during cyclopropane anesthesia, 802
Chemoreceptors, carotid, circulatory response to hypoxia, 561
Chloride, mass transfer during exchange hemodialysis, 636
Cholesterol, equilibration of plasma and adrenal, 42
Chyle, free fatty acid release from tissue stores during infusion of, 444
Circulation, carotid chemoreceptors and response to hypoxia, 561
Climate, prescriptive zone, 50, 57
Cold
radiation-induced decrease in tolerance of, 821
thyroid and adrenal response to acute exposure, 543
Computer, digital
analysis of indicator-dilution curves, 358
computation of cardiac output with gamma function, 219
Conditioning: *see* Training
Creatine-^{14}C, measurement of muscle mass by isotopic dilution, 264
Cyclopropane, cerebral electrical activity during anesthesia with, 802

Dead space, artificial ventilation, 94
Deceleration, linear, pressure dynamics in thoracic aorta during, 23
Denervation of peripheral chemoreceptors, ventilatory acclimatization to hypoxia after, 836
Deuterium oxide, determination of total body water, 354
Diet
glucose and insulin during prolonged work stress, 199
potassium in, and plasma renin activity, 299

Diuresis, hypertonic saline and mannitol, renal concentrating ability during, 209
Diving
bradycardia, exercise, and fitness, 614
cardiorespiratory responses to exercise, 34
lung function, 70
simulated, during hypoxia, 652
Dysautonomia, familial, axon reflex responses, 790

Electrical fields, extracorporeal, 89
Electrocardiogram
fetal, 248
recording myocardial, during vibration, 361
rhesus monkeys, 346
Electrodiagnosis, nerve impulse-deprived skeletal muscle, 439
Electrolytes, tissue, in hyperthermia, 13
Electromagnetic flowmeter, electronic zero for chronic application of probes, 237
Electrophysiology
airway, effect of hypoxia, 630
cardiac action potentials and refractory periods, 92
Endotoxin shock, lack of pooling in portal vein, 156
Environment
age and work in heat, 50
hot, oxygen consumption, 642
upper limit of prescriptive climate zone, 57
Erythrocytes, interactions among, under shear, 172
Estrogen, arterial blood levels of α-amino nitrogen, 1
Exercise
acid-base balance and adrenal function in newcomers to high altitude, 151
age and daily heat exposure, 50
anaerobic, oxygen deficit-oxygen debt relationships and efficiency of, 452
biochemical and histochemical effects on skeletal muscle, 762
body temperatures and sweating during thermal transients, 318
capacity in hyperbaric environments and hyperoxia, 421
cardiorespiratory responses at 1000-ft depth, 34
contractile properties of skeletal muscle, 767
diving bradycardia and fitness, 614
effect of inspired P_{CO_2} on response to, 663
hyperpnea and uniformity and efficiency of pulmonary ventilation, 63
metabolism during distance running, 251
normo- and hyperbaric oxygen effect on blood flow, 275
prolonged, glucose, insulin, and diet, 199
pulmonary artery pressure and diffusing capacity, 461
renal responses, 748
resting levels of fibrinolysis in blood, 549
serum lactate dehydrogenase isoenzyme changes, 279
specific airway conductance, 138
steady-state, free fatty acid metabolism at different work loads, 127
supine, transient cardiac output response, 183

Fatty acids, free
metabolism during steady-state exercise at different work loads, 127
release from tissue stores during chyle infusion, 444
Fibrinolysis, resting levels in blood of inactive and exercising men, 549
Fitness, diving bradycardia and exercise, 614

Glucose, prolonged work stress and diet, 199
Glycogen determination in small tissue samples, 234
Glycoprotein, postoperative responses in open-heart and nonopen-heart patients, 433
Growth, effects of hypoxia and hypercapnia, 646

Halothane, paired stimulation: effects on myocardial compliance and contractility, 391
Heart rate, muscle contraction, 758
Heat
influence of age and daily duration of exposure on response to work in, 50
intra-abdominal, deep-body thermoreceptor response, 813
tilt tolerance, 428
upper limit of prescriptive climate zone, 57
Hemodialysis, mass transfer of chloride, 636
Hemodynamics
coronary, paired ventricular stimulation, 145
hyperbaric oxygenation in myocardial infarction, 256
Hemorrhage
blood flow through renal cortex, 583
due to surgery and anesthesia, alterations in tolerance, 178
response to during CO_2 breathing, 465
Hyoscine and hyoscyamine salts, inhibition of sweating by, 779
Hyperbaric environments, physical work capacity, 421
Hypercapnia
effects, alone and with hypoxia, on growing rats, 646
exercise, 663
Hyperoxia
physical work capacity, 421
protection by altitude acclimatization against lung damage by, 474
Hyperpnea, exercise-induced, pulmonary ventilation, 63
Hypertension, plasma volume changes in upright tilt, 121
Hyperthermia, tissue electrolytes, 13
Hyperventilation
effect of carbon dioxide on oxygen uptake, 8
passive, increased oxygen uptake with, 4
Hypoaminoacidemia, estrogen, 1
Hypocapnia, oxygen uptake, 4, 8
Hypoxia
airway smooth muscle mechanics and electrophysiology, 630
carotid chemoreceptors and circulatory response to, 561
color sensitivity zones in visual field, 741
effects, alone and with hypercapnia, on growing rats, 646
responses of pulmonary arterial strips in nonaqueous baths, 566
simulated diving, 652
ventilatory acclimatization, 826, 832, 836

Ileum, electrical stimulation of isolated, 860
Immunoglobulin G degradation at high altitude, 728
Indicator-dilution curves
computer analysis, 358
mathematical models, 840
Indicator-dilution studies, mixing and observation errors, 733
Indocyanine green, source of error in measuring flow with, 190
Instruments: *see* Methods and instrumentation
Insulin, prolonged work stress and diet, 199
Inulin-^{14}C, correction for loss of measured activity, 105
Iodopyracet, measuring renal blood flow from plasma disappearance of, 79

Jejunum, leucine absorption rate and sodium and water transport, 753

Kidney
concentrating ability during hypertonic saline and mannitol diuresis, 209
effect of hemorrhage on blood flow, 583
effect of renomesenteric venous shunt on size and nucleic acid content of, 225
effect of sodium balance on blood flow, 312
responses to various rates of exercise, 748
Knee jerk, isometric study, 705

Lactate, blood, during distance running, 251
Lactate dehydrogenase, serum isoenzyme changes after muscular exertion, 279
Lead 212 loss rate from lungs, 268
Lecithin, volume-pressure curves, 470
Leucine absorption rate in jejunum, 753
Liver
bile secretion, 495
function and blood flow at high altitude, 725
Lung
alveolar shape changes with volume, 411
capillary blood flow waves in those with abnormal pulmonary hemodynamics, 793
diffusional transport, 291
effect of external support on regional alveolar expansion in excised, 133
effect of undersea exposure to N_2-O_2 on function, 70
effects of transpulmonary and vascular pressures on blood volume, 553
elasticity, 596
extravascular water and blood flow, 166
function in sickle cell disease, 574
gravity-dependent sequential emptying of regions of, 589

XUM

^{212}Pb loss rate, 268
pressure drop and fluid flow regime of inspired air, 482
pressure-volume data, 365
protection by altitude acclimatization against damage from hyperoxia, 474
stress distribution in, 596

Mannitol, renal concentrating ability during diuresis with, 209
Metabolism, anaerobic, during distance running, 251
Methods and instrumentation
approximate construction for $V_{CE_{max}}$, 507
artifactual changes in apparent left ventricular compliance due to atrial clamping, 515
audile monitor for microelectrode experiments, 858
automated recording respirometer, 700
ballistic measurement of axial mass displacement caused by breathing, 679
bile secretion in isolated liver, 495
catheter electrode study of left ventricular conduction, 519
chronic exteriorization of vascular cannulas and ECG electrodes from fetus, 248
closed-circuit respirometer suitable for low temperatures, 712
computer computations of cardiac output with gamma function, 219
computerized analysis of indicator-dilution curves, 358
constant-contact stimulating electrode for nerves, 350
constrictive and occlusive cuff for medium and large blood vessels, 510
continuous cross transfusion of blood between unrestrained rats, 383
continuous measurement of oxygen consumption, 867
control of water vapor during rapid analysis of gases in expired air, 245
CO_2 rebreathing method to determine cardiac output, 337
correction for loss of measured inulin-^{14}C activity, 105
determining effect of agents on oxyhemoglobin dissociation curves, 343
dialyzer for small animals, 689
direct writeout of total respiratory resistance, 675
effect of renomesenteric venous shunt on size and nucleic acid content of kidneys, 225
effects of preoptic and spinal cord temperature in control of thermal polypnea, 540
electrical stimulation of isolated ileum, 860
electrocardiographic studies in rhesus monkeys, 346
electronic zero for chronic application of electromagnetic flowmeter probes, 237
electrostatic ballistogram, 89
end-tidal gas sampler, 244
estimating turnover rates from specific activity-time curves, 672
external vertical cannulation of arteries without available side branches, 702
fluid-logic timed-flow ventilator, 378
gas compression and mechanical dead space in artificial ventilation, 94
gas scrubber for small high-pressure chamber, 851
glycogen determination in small tissue samples, 234
internal cooling technique, 695
isometric study of knee jerk, 705
measurement of cardiac output with nitrous oxide, 863
measurement of cerebrospinal fluid pressure, 872
measurement of mixed venous P_{O_2} by rebreathing procedure, 707
measurement of rib movement, 501
measuring renal blood flow from plasma disappearance of iodopyracet, 79
miniature implantable sonomicrometer system, 110
miniature pressure transducers for physiological measurements, 98
nanoliter constant-volume pipets, 373
nomograms for prediction of body density and total body fat from skinfold measurements, 221
nonpolarizable electrode of semimicro dimensions, 351
nonthrombogenic diffusion membrane for continuous in vivo measurement of blood gases by mass spectrometry, 375
on-line measurement of cardiac action potentials and refractory periods, 92
oxygen consumption measurement at constant oxygen tension, 685
oxyhemoglobin dissociation analyzer, 227
perfusion of cerebral ventricles of conscious rabbit, 528
placing chronic indwelling catheters, 117
plastoelastic, linear viscoelastic model for pressure-volume lung data, 365
platelet count-volume relationships, 530
plethysmographic determination of flow and volume pulsations in a limb, 333
portable laboratory respiratory, 223
production of gas bubbles in fluids by tribonucleation, 524
production of gastric hypersecretion, 505
prolonged continuous exchange transfusion of unrestrained rats, 716
recording myocardial ECG during vibration, 361
reduction of hysteresis in liquid-sealed bell-type spirometers, 216
remote switching to selected sites of variable-frequency cardiac pacing, 855
repiratory blood gases and pH in two species of unanesthetized monkeys, 108
sampling alveolar gases in awake cats, 714
scanning interior of living brain by impedography, 534
simplified measurement of respiratory resistance by forced oscillation, 113
system to give a measured volume of gas during first part of inspiration, 242
total body water by D_2O dilution using saliva samples and gas chromatography, 354
tracheal fistula, 853
transducer for direct measurement of shunts in ventricular septal defects, 380
tremor analyzer for small laboratory animals, 513
ultramicro oxygen electrode for brain tissue reoxygenation time, 387
water absorption from isolated ventral sac of cow rumen, 100
Muscle
elicitation of heart rate and blood pressure increase on contraction, 758
gastrocnemius, repayment of O_2 debt and resynthesis of high-energy phosphates, 657
measurement of mass by isotopic dilution of creatine-^{14}C, 264
repetitive depolarization from single indirect stimulation, 407
Muscle, airway smooth
effect of hypoxia on mechanics and electrophysiology, 630
effects of O_2 and CO_2 after pulmonary vascular occlusion, 570
Muscle, skeletal
biochemical and histochemical effects of exercise, 762
effects of exercise on contractile properties, 767
electrodiagnosis of nerve impulse-deprived, 439
Myocardial infarction, hemodynamic and metabolic effects of hyperbaric oxygen, 256
Myocardium
effects of halothane and paired stimulation on compliance and contractility, 391
response changes after short loading periods, 28

Nerve
distal median, temperature effects on action potential, 808
sinus, ventilatory responses to hypoxia after section of, 832
Nitrogen, alpha-amino, effect of estrogen on arterial blood levels, 1
Nitrous oxide, cardiac output measurement, 863
Nose, airflow in various body positions, 162

Oxygen
effects on airway smooth muscle after pulmonary vascular occlusion, 570
hyperbaric, hemodynamic and metabolic effects in myocardial infarction, 256
normo- and hyperbaric, resting and post-exercise blood flow, 275
Oxygen consumption
continuous measurement, 867
hot environment, 642
measurement at constant oxygen tension, 685
Oxygen debt
efficiency of anaerobic work, 452
repayment of in gastrocnemius muscle, 657
Oxygen uptake
effect of carbon dioxide in hyperventilation, 8
passive hyperventilation, 4

Oxyhemoglobin
dissociation analyzer, 227
effect of agents on dissociation curves, 343

Paired stimulation, myocardial compliance and contractility, 391
pH in two species of unanesthetized monkeys, 108
Phosphates, high-energy, resynthesis in gastrocnemius muscle, 657
Plasma, equilibration of cholesterol in adrenal and, 42
Plasma volume
changes in upright tilt, 121
in polycythemia of high altitude, 775
Platelets, count-volume relationships, 530
Plethysmography
determination of flow and volume pulsations in a limb, 333
elastic properties of arteries in vivo, 328
Polycythemia, high altitude, plasma volume and cell mass, 775
Pooling, blood, endotoxin shock, 156
Posture
airway closure, 448
pericardial pressures, 622
pulmonary blood flow, 303
regional lung volumes, 589
Potassium, dietary, plasma renin activity 299
Potentials, transmembrane action, 92
Pressure-volume relationships, plastoelastic, linear viscoelastic model, 365
Pulmonary diffusing capacity, pulmonary artery pressure in exercise, 461
Pulmonary resistance, atelectasis, 609

Radiation, decrease in cold tolerance, 821
Red cell volume in polycythemia of high altitude, 775
Renin, influence of dietary potassium on plasma activity, 299
Resistivity, thorax, at sea level and high altitude, 75
Respiration, measurement of resistance by forced oscillation, 113
Rib, measurement of movement, 501
Rumen, water absorption from ventral sac, 100
Running, distance, metabolism, 251

Saline, hypertonic, renal concentrating ability during diuresis, 209
Shear rate, erythrocyte interactions, 172
Shock, endotoxin, lack of pooling in portal vein, 156
Sickle cell disease, pulmonary function, 574
Sodium
intrarenal distribution of blood flow, 312
transport in jejunum, 753
Spirometer, hysteresis in, 216
Stomach, hypersecretion, 505
Stress, prolonged work, glucose, insulin, and diet, 199
Surgery
hemorrhage tolerance, 178
open-heart, postoperative glycoprotein responses, 433
Sweat glands, local effect of skin temperature, 18
Sweating
during thermal transients from exercise, 318
inhibition by salts of hyoscine and hyoscyamine, 779
Syncope, plasma volume changes in upright tilt, 121

Techniques: *see* Methods and instrumentation
Temperature
body, during thermal transients from exercise, 318
distal median nerve action potential, 808
skin, local effect on threshold concentration of sudorific agents, 18
sustained high skin, redistribution of blood flow during, 415
Thermoregulation
age and work in heat, 50
deep-body thermoreceptor response to intra-abdominal heating, 813
individual variation in upper limit of prescriptive climate zone, 57
Thoracoabdominal mechanics, aging, 457
Thorax resistivity at sea level and high altitude, 75
Thyroid gland, acute cold exposure, 543
Tilt tolerance, effect of heat and heat acclimatization, 428
Tilt, upright, plasma volume changes, 121
Trachea, fistula, 853
Training
serum lactate dehydrogenase isoenzyme changes after exertion, 279
total and regional blood flow and metabolism, 397

Valves, ball and disc, in vivo study of energy losses in mitral position, 282
Vascular occlusion, pulmonary, effects of O_2 and CO_2 on airway smooth muscle after, 570
Ventilation
artificial, gas compression and mechanical dead space, 94
changes induced by pursed lips breathing, 784
hypoxia, 826, 832, 836
pulmonary, exercise-induced hyperpnea, 63
Ventricle, left
catheter electrode study of conduction, 519
myocardial responses after short loading periods, 28
Ventricular stimulation, paired, coronary hemodynamics, 145
Vibration, recording myocardial ECG during, 361
Visual field, effects of hypoxia and acetazolamide on color sensitivity zones, 741
Volume-pressure relationships, lecithin, 470

Water
absorption from ventral sac of rumen, 100
extravascular lung, pulmonary blood flow, 166
transport in jejunum, 753
Work: *see* Exercise

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 28, No. 6, June 1970. *Printed in U.S.A.*

Author Index to Volume 28

Abrams, R., 1
Abramson, D. I., 808
Adibi, S. A., 753
Aguilar, J. A., 534
Akers, R., 354
Akers, T. K., 851
Alexander, J. A., 145
Andrew, G. M., 397
Anthonisen, N. R., 589
Anthopoulos, L. P., 28
Apter, J. T., 79
Arai, K., 433
Astrup, T., 549
Auchincloss, J. H., Jr., 245
Avasthey, P., 622
Ayotte, B., 863

Bache, R. J., 145
Bachofen, H., 216
Baker, D. H., 461
Banister, E. W., 421
Barlow, G., 13
Barnard, R. J., 762, 767
Barraclough, M. A., 209
Barron, D. H., 1
Basch, R. I., 312
Baule, G. H., 245
Baum, D., 156
Beale, D. K., 705
Beck, C., 802
Becklake, M. R., 397
Bell, G., 583
Beltz, R. E., 716
Beteta, L., 151
Bianco, J. A., 515
Bicher, H. I., 387
Birzis, L., 534
Blackmon, J. R., 415
Blakemore, W. S., 433
Bloor, C. M., 510
Borkowski, A. J., 42
Boska, D., 733
Bourke, R. S., 636
Bowdoin, B., 264
Brakman, P., 549
Brand, D. H., 89
Brandt, G., 216
Brantigan, J. W., 375
Brauer, R. W., 474
Brengelmann, G. L., 415
Brooks, D. E., 172
Buckles, R. G., 227
Bump, S., 225
Burke, W. M., 444
Bushnell, L. S., 94
Buskirk, E. R., 354

Cain, S. M., 4, 8
Carcelen, A., 151
Carroll, D. R., 279
Cerretelli, P., 707
Chakravarti, R. N., 346
Chhuttani, P. N., 346
Chow, J., 343
Clark, D. L., 802
Clark, D. O., 219
Clausen, J. P., 337
Clayton, D. L., 700
Coleman, T. G., 358
Collins, K. J., 50
Conroy, M., 312
Cooper, K. H., 279
Corey, J., 872
Corney, P. L., 672
Cortell, S., 105
Costill, D. L., 251
Coulam, C. M., 622
Craig, F. N., 779
Crenshaw, M. C., 1
Criddle, F. J., Jr., 358
Crossman, P. F., 94
Crumpton, C. W., 117
Curet, L. B., 1

Daggett, W. M., 515
Dahn, I., 328, 333
Daly, W. J., 461
Dart, G. A., 482
Davis, C. M., 705
Dawson, A., 242
Dedrick, R. L., 636
Delcroix, C., 42
DePalma, P. D., 853
Deroanne, R., 642
DeVincenzo, J. P., 716
Dinsmore, R. E., 515
Di Prampero, P. E., 707
Dluhy, R. G., 299
Dobson, A., 100
Domenech, R. J., 190
Dow, R. C., 528
Downey, J. M., 858
Dubkin, C., 350
DuBois, A. B., 70
Duncan, W. R., 421
Dustan, H. P., 121
Duvelleroy, M. A., 227

Edgerton, V. R., 762, 767
Elsner, R., 614
Endahl, G. L., 505
Epstein, M., 312
Epstein, R. A., 407
Ettinger, P. O., 519

Fajri, J., 75
Fallat, R. J., 570
Fell, C., 178
Femi-Pearse, D., 574
Fergusson, G. J., 375
Figallo, M., 775
Filley, G. F., 482, 784
Finchum, R. N., 183
Fisher, A. B., 70
Fogarty, T., 282
Folts, J. D., 237
Ford, G. D., 685
Foster, K., 50
Freedberg, L. E. 515
Freyschuss, U., 758
Frohlich, E. D., 121

Gabelnick, H. L., 636
Gagge, A. P., 318
Gamboa, R., 75
Garrison, J. C., 685
Gazioglu, K., 574
Gennari, F. J., 105
Gilbert, D. B., 282
Gilbert, R., 245, 712
Gillespie, J. R., 108
Gillett, D. J., 213
Glazier, J. B., 553
Goldberg, A. H., 391
Goldman, M., 113
Goodman, P., 256
Goodwin, J. W., 172
Gott, V. L., 375
Green, M., 790
Greenfield, J. C., Jr., 145
Guieu, J. D., 540
Guignard, J. P., 209
Guntheroth, W. G., 156, 609
Guttmann, R. D., 312

Halmagyi, D. F. J., 213, 465
Hamilton, F. N., 244
Hanson, P. G., 23
Hardy, J. D., 540
Harper, A. M., 583
Harris, E. K., 282
Harris, T. R., 840
Harrison, M. H., 771
Hayes, K. C., 872
Heath, D. F., 672
Hedley-Whyte, J., 94
Hedner, P., 543
Heistad, D. D., 652
Hermsmeyer, K., 858
Hildebrandt, J., 216, 365
Himwich, W. A., 702
Hinchey, E. J., 855
Hlavova, A., 808
Hoffman, B. F., 92
Hoffman, J. I. E., 190
Hogg, J., 133
Hognestad, H., 98
Hollenberg, N. K., 312
Hori, T., 721
Hughes, J. M. B., 553
Humphreys, P. W., 50
Hursh, J. B., 268
Hutchinson, W. J., 695
Hyatt, R. E., 675
Hyde, R. W., 70

Ikels, K. G., 524
Ingram, M., 530
Isaacson, L. C., 373
Iwabuchi, T., 702

Jackson, J. A., 505
Jackson, S. H., 407
Jacobson, J. H., 256, 275
Janicki, J. S., 578
Jarnum, S., 725, 728
Javid, M., 695
Jenden, D. J., 513
Johnson, C. D., 256
Johnson, R. E., 748
Johnston, W. H., 375
Jones, N. F., 209
Jones, W. B., 183
Jonson, B., 328, 333
Jordanoglou, J., 501
Josenhans, W. T., 679

Kachadorian, W. A., 748
Kagawa, J., 138
Kaplan, A. S., 793
Karetzky, M. S., 8
Katsura, T., 133
Kavanagh, B., 853
Kazemi, H., 470
Keefe, J. F., 89
Kent, B. B., 507
Kerem, D., 614
Kerr, H. D., 138
Khan, M. I., 519
Kimbel, P., 793
King, J. B., 495
Kirkebø, A., 98
Klassen, G. A., 397
Klastersky, J., 42
Kline, H. J., 256
Klingele, T. G., 411
Knight, C. J., 70
Knisely, M. H., 387
Knudson, R. J., 113
Kobrick, J. L., 741
Kontos, H. A., 561
Kreisberg, R. A., 264
Kroeger, E., 630
Kuhn, L. A., 256

La Force, R. C., 291
Lambertsen, C. J., 70
Larsen, L. E., 351
Larsen, O. A., 337
Laurell, S., 543
Laver, M. B., 227
Leblanc, P., 448
Lee, R. D., 110
Lehan, P. H., 223
Leith, D., 596
Leith, D. E., 378
Lenfant, C., 63
Levin, S., 42
Levine, H. J., 89
Levine, O. R., 166
Lewis, B. M., 291
Lind, A. R., 50, 57
Lloyd, T. C., Jr., 566
Lo, S., 234
Longmuir, I. S., 343
Lowe, S. L., 379

Malt, R. A., 225
Mann, L., 1
Marano, A. J., 256
Marazzini, L., 457
Markov, A., 444
Marshall, R., 853
McIlroy, M. B., 863
Mead, J., 113, 596
Meador, C. K., 264
Mellins, R. B., 166
Melsher, H. J., 121
Mendez, J., 354
Menn, S. J., 663
Mercer, T. T., 268
Merino, C., 775
Merrill, E. W., 470
Merrill, J. P., 312
Mesel, E., 380
Meyerstein, N., 428
Milic-Emili, J., 133, 448

Miller, D. A., 689
Mines, A. H., 826, 832
Mitchell, J. W., 695
Moir, A. T. B., 528
Moncloa, F., 151
Morgan, B. C., 609
Moulopoulos, S. D., 28
Moxley, R. T., 549
Mueller, R. E., 784
Müller-Ruchholtz, W., 383
Munson, E. S., 108
Murray, J. A., 415
Myerburg, R. J., 92
Myers, G. E., 695

Nadel, J. A., 570
Naftchi, N. E., 275
Naitove, A., 714
Nakeff, A., 530
Neering, I. R., 465
Newman, E. V., 840
Nilsén, R., 328, 333
Noble, M. I. M., 190
Nolan, S. P., 282
Nosslin, B., 543

Oester, Y. T., 439
Oforsagd, P., 421
Ogawa, T., 18
Oldewurtel, H. A., 444
Olson, D. E., 482
Oshiba, S., 495

Pagé, E., 712
Park, M. K., 156
Parrish, D. E., 474
Patel, D. J., 578
Patrick, T. R., 421
Patterson, R. E., 507
Paul, P., 127
Pavek, E., 733
Pavek, K., 733
Peirce, E. C. II, 507
Peklak, G. J., 860
Pepelko, W. E., 646
Pessotti, R. L., 474
Peter, J. B., 762, 767
Peters, G. M., 675
Peterson, N., 113
Petit, J. M., 642
Petty, T. L., 784
Phear, W. P. C., 391
Phillips, R. D., 821
Picon-Reategui, E., 354
Piiper, J., 657
Pirnay, F., 642
Potdar, A., 162
Powell, W. J., Jr., 515
Pratt, P. C., 474
Preisig, R., 725, 728
Prokop, E., 354
Pruett, E. D. R., 199

Quick, K., P., 813

Ramsøe, K., 725, 728
Rao, S., 162
Rausch, D. C., 34
Rauterkus, L. T., 89
Rawson, R. O., 813
Reed, J. H., Jr., 303
Reeves, T. J., 183
Regan, T. J., 444, 519
Reich, T., 275
Reininger, E. J., 855
Rembert, J. C., 145
Rennie, D. W., 707
Rerup, C., 543
Resnick, B., 853
Richardson, D. W., 561
Rickert, B., 808
Rizzato, G., 457
Robb, F. T., 373
Robert, E. D., 439
Robertson, P. C., 589
Rocamora, J. M., 242
Romero, M. A., 75
Rose, L. I., 279
Rosengren, E., 543
Rosenkaimer, S., 227
Rosenzweig, D. Y., 553
Rosner, B. S., 802
Ross, S. M., 92
Ross, W. R. D., 589
Roth, G. I., 721
Rowell, L. B., 415
Rozencwajg, R., 133
Ruff, F., 448
Rusher, J. L., 63
Russell, J. C., 234
Russell, R. O., Jr., 183

Saltin, B., 318
Saltzman, H. A., 34
Salzano, J., 34
Sánchez, C., 775
Sanders, C. A., 515
Sandler, H., 110
Sass, D. J., 361
Saunders, K. B., 190
Scheel, K. W., 223
Schoenfield, L. J., 495
Schwaber, J. R., 113
Schwartz, F. D., 79
Schwartz, W. B., 105
Scotto, P., 714
Scriabine, A., 860
Seaman, G. V. F., 172
Seard, C., 452
Sellers, A. F., 100
Senior, R. M., 166
Serck-Hanssen, F., 98
Severinghaus, J. W., 244
Seymour, J., 863
Sham, G. B., 510
Shannon, D. C., 470
Shaw, G. T., 100
Shepherd, A. P., Jr., 223
Shvartz, E., 428
Silverman, R. W., 513
Sinclair, R. D., 663
Singh, R., 346
Sloan, A. W., 221
Smith, A. A., 790
Smith, K. A., 470
Smith, L., 501
Sonntag, H.-G., 383
Sørensen, S. C., 826, 832, 836
Spiller, P., 657
Spurr, G. B., 13
Stamatelopoulos, S. F., 28
Starmer, C. F., 219
Staub, N. C., 411
Stephens, N. L., 630
Stewart, J. W., 92
Stewart, S., 282
Stoll, P. J., 63
Stolwijk, J. A. J., 318
Strømme, S. B., 614
Sullivan, W. J., 675
Sutherland, P. W., 133
Sweetland, K. F., 50

Tachibana, S., 534
Takishima, T., 596
Talso, J., 808
Tarazi, R. C., 121
Tauber, J., 725, 728
Taunton, J. E., 421
Taylor, A. W., 234
Temples, J., 507
Thompson, R. E., 851
Tisi, G. M., 570
Trap-Jensen, J., 337
Troutman, S. J., Jr., 867
Truelove, J. F., 248
Tucker, W. K., 578
Tuckman, J., 275
Tung, C., 227
Tygstrup, N., 725, 728

Underwood, R. H., 299

Van Petten, G. R., 248
Varga, D., 465
Vaughn, J. J., 242
Vestal, M. L., 375
Vetrovec, G. W., 561
Vogel, T. T., 505

Wagman, I. H., 108
Wahi, P. L., 346
Wallace, H. W., 433
Wang, C. S., 679
Wasserman, K., 452
Way, R. O., 474
Webb, P., 867
Weir, J. B. de V., 221
Weirich, W. E., 117
Welch, B. E., 663
Westergaard, H., 725, 728
Wheeler, R. C., 652
Whipp, B. J., 452
White, F. C., 510
Will, J. A., 117
Willes, R. F., 248
Williams, G. H., 299
Wilson, D. M., 79
Wilson, O., 543
Wohl, M. E., 113
Wolfe, W. G., 570
Wolfson, S., 279
Wolk, M. J., 89
Wong, P. S.-L., 470
Wood, E. H., 303, 622

Yamamoto, W. S., 721
Yankell, S. L., 853
Yu, P. N., 574

Zimmerman, I. R., 675

Journal of
APPLIED PHYSIOLOGY

VOLUME 28 *January–June 1970*

PUBLICATIONS COMMITTEE, AMERICAN PHYSIOLOGICAL SOCIETY

D. S. FREDRICKSON, *Chairman* P. F. CURRAN JERE MEAD

SARA F. LESLIE, *Publications Manager and Executive Editor*

W. A. SONNENBERG, *Business Manager* JUDITH P. BLOOMER, *Copy Editor*

EDITORIAL BOARD

Section Editors
Circulation—D. F. BOHR; THEODORE COOPER; W. C. RANDALL
Respiration—L. E. FARHI; SOLBERT PERMUTT
Renal and Electrolyte Physiology—W. B. KINTER; E. E. WINDHAGER
Gastrointestinal Physiology—P. F. CURRAN
Endocrinology and Metabolism—B. R. LANDAU; F. E. YATES
Environmental Physiology—J. D. HARDY
Comparative and General Physiology—C. L. PROSSER
Neurophysiology—D. P. PURPURA
Hematology—O. D. RATNOFF

EUGENE ACKERMAN
E. F. ADOLPH
T. H. ALLEN
M. E. AVERY
C. H. BAKER
BRUNO BALKE
D. E. BASS
AREND BOUHUYS
EUGENE BRAUNWALD
F. N. BRIGGS
R. W. BULLARD
E. R. BUSKIRK
C. A. CHIDSEY
R. F. COBURN
C. R. COLLIER
BURTON COMBES
F. N. CRAIG
W. J. DALY
J. M. DAVIDSON
R. P. DURBIN
H. A. EDER
CHARLES EDWARDS
J. N. FAIN
J. G. FORTE
D. L. FRANKLIN
A. P. GAGGE
DONALD GANN
G. H. GIEBISCH
J. P. GILMORE
H. M. GOODMAN
F. S. GRODINS
N. S. HALMI
A. E. HARPER
R. J. HAVEL
E. W. HAWTHORNE
J. A. HERD
T. F. HORNBEIN
S. M. HORVATH
R. E. HYATT
K. E. JOCHIM
P. C. JOHNSON
A. M. KATZ
JOSEPH KATZ
ROBERT KATZMAN
FREDERIC KAVALER
D. L. KLINE
F. J. KLOCKE
J. L. KOSTYO
G. A. LANGER
D. H. K. LEE
M. N. LEVY
NATHAN LIFSON
L. S. LILIENFIELD
R. D. LISK
T. C. LLOYD
P. T. MACKLEM
R. L. MALVIN
JEAN MARSHALL
S. E. MAYER
M. B. MCILROY
K. L. MELMON
R. A. MITCHELL
H. E. MORGAN
Q. R. MURPHY
J. A. NADEL
ARNOLD NAIMARK
N. M. NELSON
JACK ORLOFF
SIMON OSTRACH
NELLO PACE
J. R. PAPPENHEIMER
E. P. RADFORD, JR.
D. W. RENNIE
SID ROBINSON
P. S. ROHEIM
J. C. ROSS
JOHN ROSS, JR.
IRVING ROTHCHILD
A. M. SCHER
S. G. SCHULTZ
R. A. SHIPLEY
E. R. SIMON
WILLIAM SLEATOR, JR.
N. C. STAUB
ROBERT STEELE
J. A. J. STOLWIJK
R. V. TALMAGE
D. F. TIERNEY
FRANK ULRICH
JOHN URQUHART
D. C. VAN DYKE
H. D. VAN LIEW
A. G. WALLACE
W. H. WAUGH
J. W. WEINBERG
L. G. WELT
JOHN WEST
SAUL WINEGRAD
M. B. ZUCKER

AMERICAN PHYSIOLOGICAL SOCIETY 9650 Rockville Pike, Bethesda, Md. 20014

UM

COPYRIGHT © 1970, BY
THE AMERICAN PHYSIOLOGICAL SOCIETY, INC.

PRINTED IN THE UNITED STATES OF AMERICA
BY WAVERLY PRESS, INC., BALTIMORE, MARYLAND

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 28, No. 6, June 1970. *Printed in U.S.A.*

Guest Referee Editors

The Publications Committee of the American Physiological Society gratefully acknowledges the services of the following guest referee editors who assisted the Editorial Board in the review of papers published in this volume of the Journal.

R. M. Abrams
T. Adams
W. R. Adey
R. W. Albers
R. Albert
N. Alexander
B. Anders
O. S. Anderson
M. Anliker
N. R. Anthonisen
J. T. Apter
T. S. Argyris
B. Armstrong
W. C. Ball, Jr.
C. A. Barraclough
J. B. Bassingthwaighte
D. Bates
J. W. Bean
M. R. Becklake
A. R. Behnke
H. Bendixen
R. Benesch
J. C. Benton
W. H. Bergstrom
L. M. Bernstein
J. L. Bethune
A. Bill
B. Bishop
B. Bloor
A. Bortoff
A. Brady
M. A. B. Brazier
G. Brecher
B. M. Brenner
K. M. Brinkhous
M. J. Brody
K. Brown-Grant
R. A. Bruce
K. J. Buettner
B. S. Bull
B. Burrows
J. Butler
G. F. Cahill
E. J. M. Campbell
L. D. Carlson
C. G. Caro
J. Casby
S. E. Charms
V. Chernick
J. Christensen
H. N. Christensen
D. Clarke
J. A. Clements
M. Clifford
B. Coleman
V. Collins
C. L. Comar
G. E. Combs
R. Conrad
E. Cotzias
J. W. Covell
E. P. Cronkite
W. Crosley
G. Cumming
A. Damon
D. L. Davis
J. O. Davis
P. W. Davis
P. Deetjen
R. Dell
W. Dement
J. J. Deren
R. L. Detar
P. B. Dobrin
V. H. Donaldson
J. Douglas
W. Douglas
A. B. DuBois
L. E. Early
H. M. Eberhart
R. W. Eckstein
K. B. Eik-Ness
A. N. Epstein
F. H. Epstein
S. E. Epstein
E. Evarts
J. Faulkner
B. C. Ferris, Jr.
A. P. Fishman
J. H. Fleisch
R. Fleming
G. E. Folk
E. L. Forker
R. E. Forster
N. Fowler
I. J. Fox
R. A. Freedland
W. Fried
H. Frischer
M. J. Frumin
H. H. Fudenberg
P. Galletti
W. F. Ganong
L. A. Geddes
A. Gellhorn
L. Gertz
W. Gesterland
G. Glick
E. Goldensohn
D. E. Goldman
S. Goldring
D. S. Goodman
R. Gorlin
V. Gott
C. W. Gottschalk
H. D. Green
H. Grundfest
W. G. Guntheroth
T. Hammel
G. D. Hammond
A. S. Harris
S. C. Hartman
T. Hayashi
S. R. Heisey
B. Hertig
J. Hildebrandt
P. Hirsch
J. P. Hoare
B. Issekutz, Jr.
D. Jackson
J. Jacquez
M. Jaeger
T. N. James
J. Jamieson
R. E. Johnson
M. Johnston
R. T. Jones
N. Kahn
G. A. Kaiser
G. Kaley
P. V. Karpovich
M. Kashgarian
G. M. Katz
R. H. Kellogg
D. V. Kimberg
D. M. Kipnis
J. E. Kirk
V. Klig
R. C. Kory
M. E. Krahl
W. G. Kubicek
P. Kuo
J. A. Kylstra
P. Lacy
A. Lajtha
C. J. Lambertsen
W. Landau
A. J. Lande
W. H. Langham
E. H. Lanphier
H. Lanson
D. P. Lauler
M. Laver
D. E. Leith
C. Lenfant
M. Leon
R. J. Levone
J. E. Levy
B. M. Lewis
J. E. Lewy
W. Lick
M. B. Lipsett
C. W. Lloyd
H. B. Lofland
I. London
C. N. H. Long
I. S. Longmuir
J. L. Lucas
T. Maack
M. Mager
C. Mangum
S. Margolis
L. Marks
W. Marshall
D. Marsland
D. T. Mason
D. Maurice
R. Maxwell
D. A. McDonald
H. D. McIntosh
H. W. Mergler
J. P. Merrill
J. Metcalfe
J. Milic-Emili
W. R. Milnor
J. W. Mitchell
D. Mohrman
W. F. H. M. Mommaerts
H. Mueller-Eberhart
J. R. Murphy
H. Navert
C. S. Nicoll
A. Nidel
C. V. Paganelli
S. S. Park
L. D. Peachey
C. Pfaffman
G. Pickford
B. D. Polis
V. Popovic
D. Porte
G. G. Power
K. Pribam
D. Rall
G. M. Rapp
R. O. Rawson
O. K. Reiss
R. J. Reiter
J. W. Remington
E. Renkin
R. L. Riley
K. C. Robbins
J. S. Robertson
E. D. Robin
H. Rosomoff
C. R. Ross
G. Ross
C. F. Rothe
L. B. Rowell
A. M. Rudolph
R. Ryall
K. Sagawa
S. I. Said
G. M. Saidel
P. Saltman
H. Sandler
K. E. Schaefer
R. W. Schayer
H. P. Schedl
D. Scherf
R. Schimmel
G. Schoepfle
P. F. Scholander
A. Schwartz
W. B. Schwartz
J. W. Severinghaus
L. S. Shanker
G. D. Sharp
J. T. Shepherd
R. L. Sidman
A. A. Siebens
P. H. Sih
C. R. Smith
E. Smith
O. L. K. Smith
R. Smith
F. M. Snell
K. Soergel
W. A. Spencer
S. Steelman
M. Stein
S. Steinberg
P. R. Steinmetz
J. Stephenson
J. C. Stevens
J. Stitt
B. Surawicz
A. Szent-Gyorgyi
G. Tanner
C. Tidball
D. C. Tosteson
R. Travis
J. Trier
J. VanBruggen
A. Van Harreveld
J. Van Pilsum
R. Van Reen
G. Warner
K. Wasserman
L. Webster
J. Weeks
N. Weiner
C. A. Wiederhielm
J. S. Willis
F. H. Wilt
M. F. Wilson
M. L. Wolbarsht
S. G. Wolf
E. Wright
D. Silversmit
W. F. Zimmerman

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 28, No. 6, June 1970. *Printed in U.S.A.*

Contents of Volume 28

Key to Sections:
1. Circulation
2. Respiration
3. Renal & Electrolyte Physiology
4. Gastrointestinal Physiology
5. Endocrinology & Metabolism
6. Environmental Physiology & Exercise
7. Comparative Physiology
8. General Physiology
9. Neurophysiology
10. Hematology
11. Muscle Physiology

No. 1. JANUARY 1970

SECTION		PAGE
5, 8	Effect of estrogen on arterial blood levels of alpha-amino nitrogen. *L. B. Curet, L. Mann, R. Abrams, M. C. Crenshaw, and D. H. Barron*	1
2	Increased oxygen uptake with passive hyperventilation of dogs. *S. M. Cain*	4
2	Effect of carbon dioxide on oxygen uptake during hyperventilation in normal man. *M. S. Karetzky and S. M. Cain*	8
3, 6	Tissue electrolytes in hyperthermic dogs. *G. B. Spurr and G. Barlow*	13
6	Local effect of skin temperature on threshold concentration of sudorific agents. *T. Ogawa*	18
1, 6	Pressure dynamics in thoracic aorta during linear deceleration. *P. G. Hanson*	23
1, 8, 11	Myocardial response changes after short loading periods. *S. D. Moulopoulos, L. P. Anthopoulos, and S. F. Stamatelopoulos*	28
1, 2, 6	Cardiorespiratory responses to exercise at a simulated seawater depth of 1,000 feet. *J. Salzano, D. C. Rausch, and H. A. Saltzman*	34
5, 8	Equilibration of plasma and adrenal cholesterol in man. *A. J. Borkowski, S. Levin, C. Delcroix, and J. Klastersky*	42
6	Influence of age and daily duration of exposure on responses of men to work in heat. *A. R. Lind, P. W. Humphreys, K. J. Collins, K. Foster, and K. F. Sweetland*	50
6	Effect of individual variation on upper limit of prescriptive zone of climates. *A. R. Lind*	57
2, 6	Exercise-induced hyperpnea and uniformity and efficiency of pulmonary ventilation. *J. L. Rusher, P. J. Stoll, and C. Lenfant*	63
2, 6	Effect of 2 months' undersea exposure to N_2-O_2 at 2.2 Ata on lung function. *A. B. Fisher, A. B. DuBois, R. W. Hyde, C. J. Knight, and C. J. Lambertsen*	70
6	Thorax resistivity at sea level and at high altitude. *R. Gamboa, M. A. Romero, and J. Fajri*	75

SPECIAL COMMUNICATIONS

1, 3, 8	A model for measuring renal blood flow from plasma disappearance of iodopyracet. *D. M. Wilson, J. T. Apter, and F. D. Schwartz*	79
1, 2	Electrostatic ballistogram: analysis of electrical fields about the human body. *J. F. Keefe, L. T. Rauterkus, M. J. Wolk, D. H. Brand, and H. J. Levine*	89
1, 8	On-line measurement of duration of cardiac action potential and refractory periods. *R. J. Myerburg, J. W. Stewart, S. M. Ross, and B. F. Hoffman*	92
1, 2	Dead space during artificial ventilation: gas compression and mechanical dead space. *P. F. Crossman, L. S. Bushnell, and J. Hedley-Whyte*	94
1, 8	Miniature pressure transducers for physiological measurements. *A. Kirkebø, H. Hognestad, and F. Serck-Hanssen*	98
4	Absorption of water from isolated ventral sac of rumen of the cow. *A. Dobson, A. F. Sellers, and G. T. Shaw*	100
3	Loss of measured activity of inulin-^{14}C and a corrective technique. *F. J. Gennari, S. Cortell, and W. B. Schwartz*	105
2, 7	Respiratory blood gases and pH in two species of unanesthetized monkeys. *E. S. Munson, J. R. Gillespie, and I. H. Wagman*	108
1	Miniature implantable sonomicrometer system. *R. D. Lee and H. Sandler*	110
2	A simplified measurement of respiratory resistance by forced oscillation. *M. Goldman, R. J. Knudson, J. Mead, N. Peterson, J. R. Schwaber, and M. E. Wohl*	113
1, 7, 8	A technique for placing chronic indwelling catheters in swine. *W. E. Weirich, J. A. Will, and C. W. Crumpton*	117

No. 2. FEBRUARY 1970

1, 8	Plasma volume with upright tilt: studies in hypertension and in syncope. *R. C. Tarazi, H. J. Melsher, H. P. Dustan, E. D. Frohlich*	121
5, 6, 11	FFA metabolism of normal dogs during steady-state exercise at different work loads. *P. Paul*	127
2	Effect of external support on regional alveolar expansion in excised dog lungs. *T. Katsura, R. Rozencwajg, P. W. Sutherland, J. Hogg, J. Milic-Emili*	133

SECTION			PAGE
2, 6	Effects of brief graded exercise on specific airway conductance in normal subjects.	*J. Kagawa, H. D. Kerr*	138
1	Coronary hemodynamic responses to paired ventricular stimulation in the awake dog.	*R. J. Bache, J. A. Alexander, J. C. Rembert, J. C. Greenfield, Jr.*	145
5, 6	Physical exercise, acid-base balance, and adrenal function in newcomers to high altitude.	*F. Moncloa, A. Carcelen, L. Beteta*	151
1	Lack of pooling in portal vein in endotoxin shock in the dog.	*M. K. Park, D. Baun, W. G. Guntheroth*	156
1, 2, 6	Nasal airflow with body in various positions.	*S. Rao, A. Potdar*	162
1	Extravascular lung water and distribution of pulmonary blood flow in the dog.	*O. R. Levine, R. B. Mellins, R. M. Senior*	166
1, 8, 10	Interactions among erythrocytes under shear.	*D. E. Brooks, J. W. Goodwin, G. V. F. Seaman*	172
1	Alterations in tolerance of hemorrhage due to surgery and duration of anesthesia.	*C. Fell*	178
1	Transient cardiac output response to multiple levels of supine exercise.	*W. B. Jones, R. N. Finchum, R. O. Russell, Jr., T. J. Reeves*	183
1	A source of error in measuring flow with indocyanine green.	*K. B. Saunders, J. I. E. Hoffman, M. I. M. Noble, R. J. Domenech*	190
5, 6	Glucose and insulin during prolonged work stress in men living on different diets.	*E. D. R. Pruett*	199
3	Renal concentrating ability during hypertonic saline and mannitol diuresis in the rabbit.	*M. A. Barraclough, J. P. Guignard, N. F. Jones*	209
1	Accuracy of single-label blood volume measurement before and after corrected blood loss in sheep and dogs.	*D. J. Gillett, D. F. J. Halmagyi*	213

SPECIAL COMMUNICATIONS

2	Reduction of hysteresis in liquid-sealed bell-type spirometers.	*J. Hildebrandt, H. Bachofen, G. Brandt*	216
1	Computer computations of cardiac output using the gamma function.	*C. F. Starmer, D. O. Clark*	219
5	Nomograms for prediction of body density and total body fat from skinfold measurements.	*A. W. Sloan, J. B. de V. Weir*	221
2, 8	A portable laboratory respirator.	*A. P. Shepherd, Jr., K. W. Scheel, P. H. Lehan*	223
1, 3, 5	Renomesenteric venous shunt in the rat: effect of size and nucleic acid content of kidneys.	*S. Bump, R. A. Malt*	225
2, 10	An oxyhemoglobin dissociation analyzer.	*M. A. Duvelleroy, R. G. Buckles, S. Rosenkaimer, C. Tung, M. B. Laver*	227
6, 11	Determination of glycogen in small tissue samples.	*S. Lo, J. C. Russell, A. W. Taylor*	234
1	Electronic zero for chronic application of electromagnetic flowmeter probes.	*J. D. Folts*	237
2	A system to give a measured volume of gas during first part of inspiration.	*A Dawson, J. J. Vaughn, J. M. Rocamora*	242
2, 6	End-tidal gas sampler.	*J. W. Severinghaus, F. N. Hamilton*	244
2, 6, 8	Control of water vapor during rapid analysis of respiratory gases in expired air.	*J. H. Auchincloss, Jr., R. Gilbert, G. H. Baule*	245
1, 8	Chronic exteriorization of vascular cannulas and ECG electrodes from the ovine fetus.	*R. F. Willes, G. R. Van Petten, J. F. Truelove*	248

No. 3. MARCH 1970

1, 2, 6	Metabolic responses during distance running.	*D. L. Costill*	251
1	Hemodynamic and metabolic effects of hyperbaric oxygenation in myocardial infarction.	*H. J. Kline, A. J. Marano, C. D. Johnson, P. Goodman, J. H. Jacobson II, and L. A. Kuhn*	256
11	Measurement of muscle mass in humans by isotopic dilution of creatine-^{14}C.	*R. A. Kreisberg, B. Bowdoin, and C. K. Meador*	264
2	Measurement of ^{212}Pb loss rate from human lungs.	*J. B. Hursh and T. T. Mercer*	268
1, 6	Effect of normo- and hyperbaric oxygenation on resting and postexercise calf blood flow.	*T. Reich, J. Tuckman, N. E. Naftchi, and J. H. Jacobson*	275
6	Serum lactate dehydrogenase isoenzyme changes after muscular exertion.	*L. I. Rose, S. L. Lowe, D. R. Carroll, S. Wolfson, and K. H. Cooper*	279
1	An in vivo study of energy losses of ball and disc valves in the mitral position.	*D. B. Gilbert, S. P. Nolan, S. Stewart, T. Fogarty, and E. K. Harris*	282
2	Diffusional transport in the human lung.	*R. C. La Force and B. M. Lewis*	291
1, 3, 5	Influence of dietary potassium on plasma renin activity in normal man.	*R. G. Dluhy, R. H. Underwood, and G. H. Williams*	299
1, 2, 6	Effect of body position on vertical distribution of pulmonary blood flow.	*J. H. Reed, Jr., and E. H. Wood*	303
1, 3	Effect of sodium balance on intrarenal distribution of blood flow in normal man.	*N. K. Hollenberg, M. Epstein, R. D. Guttman, M. Conroy, R. I. Basch, and J. P. Merrill*	312
1, 6, 11	Body temperatures and sweating during thermal transients caused by exercise.	*B. Saltin, A. P. Gagge, and J. A. J. Stolwijk*	318
1, 8	Plethysmographic in vivo determinations of elastic properties of arteries in man.	*I. Dahn, B. Johnson, and R. Nilsén*	328

SECTION PAGE

SPECIAL COMMUNICATIONS

1 A plethysmographic method for determination of flow and volume pulsations in a limb. *I. Dahn, B. Johnson, and R. Nilsén* 333
1, 2 Cardiac output in middle-aged patients determined with CO_2 rebreathing method. *J. P. Clausen, O. A. Larsen, and J. Trap-Jensen* 337
1, 2, 10 Rapid method for determining effect of agents on oxyhemoglobin dissociation curves. *I. S. Longmuir and J. Chow* 343
1 Electrocardiographic studies in rhesus monkeys. *R. Singh, R. N. Chakravarti, P. N. Chhuttani, and P. L. Wahi* 346
8, 9, 11 A constant-contact stimulating electrode for nerves. *C. Dubkin* 350
9 A nonpolarizable electrode of semimicro dimensions. *L. E. Larsen* 351
3, 5, 8 Total body water by D_2O dilution using saliva samples and gas chromatography. *J. Mendez, E. Prokop, E. Picon-Reategui, R. Akers, and E. R. Buskirk* 354
1, 8 Computerized analysis of indicator-dilution curves. *T. G. Coleman and F. J. Criddle, Jr.* 358
6 A method for recording myocardial ECG in animals during intense vibration. *D. J. Sass* 361
2 Pressure-volume data of cat lung interpreted by a plastoelastic, linear viscoelastic model. *J. Hildebrandt* 365
3 Nanoliter constant-volume pipets: simple construction. *F. T. Robb and L. C. Isaacson* 373
2, 8 A nonthrombogenic diffusion membrane for continuous in vivo measurement of blood gases by mass spectrometry. *J. W. Brantigan, V. L. Gott, M. L. Vestal, G. J. Fergusson, and W. H. Johnston* 375
2 A fluid-logic timed-flow ventilator. *D. E. Leith* 378
1 Transducer for direct measurement of shunts in experimental ventricular septal defects. *E. Mesel* 380
1 A simple method for continuous cross transfusion of blood between unrestrained rats. *W. Müller-Ruchholtz and H.-G. Sonntag* 383
1, 9, 10 Brain tissue reoxygenation time, demonstrated with a new ultramicro oxygen electrode. *H. I. Bicher and M. H. Knisely* 387

No. 4. APRIL 1970

1, 11 Halothane and paired stimulation: effects on myocardial compliance and contractility. *A. H. Goldberg and W. P. C. Phear* 391
1, 6, 11 Effect of training on total and regional blood flow and metabolism in paddlers. *G. A. Klassen, G. M. Andrew, and M. R. Becklake* 397
9, 11 Repetitive muscle depolarization from single indirect stimulation in anesthetized man. *R. A. Epstein and S. H. Jackson* 407
2 Alveolar shape changes with volume in isolated, air-filled lobes of cat lung. *T. G. Klingele and N. C. Staub* 411
1, 4, 6 Redistribution of blood flow during sustained high skin temperature in resting man. *L. B. Rowell, G. L. Brengelmann, J. R. Blackmon, and J. A. Murray* 415
2, 6, 11 Physical work capacity in hyperbaric environments and conditions of hyperoxia. *J. E. Taunton, E. W. Banister, T. R. Patrick, P. Oforsagd, and W. R. Duncan* 421
6 Effect of heat and natural acclimatization to heat on tilt tolerance of men and women. *E. Shvartz and N. Meyerstein* 428
1, 10 Comparison of postoperative glycoprotein responses in open-heart and nonopen-heart patients. *H. W. Wallace, K. Arai, and W. S. Blakemore* 433
9, 11 Electrodiagnosis of nerve-impulse deprived skeletal muscle. *E. D. Robert and Y. T. Oester* 439
5, 8 Free fatty acid release from tissue stores during chyle infusion. *T. J. Regan, H. A. Oldewurtel, A. Markov, and W. M. Burke* 444
2 Effects of age and body position on "airway closure" in man. *P. Leblanc, F. Ruff, and J. Milic-Emili* 448
6 Oxygen deficit-oxygen debt relationships and efficiency of anaerobic work. *B. J. Whipp, C. Seard, and K. Wasserman* 452
2 Thoracoabdominal mechanics in elderly men. *G. Rizzato and L. Marazzini* 457
1, 2, 8 Relationship of pulmonary artery pressure to exercise diffusing capacity ($D_{L_{CO}}$). *D. H. Baker and W. J. Daly* 461
1, 2 Response to hemorrhage during CO_2 breathing. *D. F. J. Halmagyi, I. R. Neering, and D. Varga* 465
2 Restoration of volume-pressure curves with a lecithin fog. *D. C. Shannon, H. Kazemi, E. W. Merrill, K. A. Smith, and P. S.-L. Wong* 470
6 Protection by altitude acclimatization against lung damage from exposure to oxygen at 825 mm Hg. *R. W. Brauer, D. E. Parrish, R. O. Way, P. C. Pratt, and R. L. Pessotti* 474
2 Pressure drop and fluid flow regime of air inspired into the human lung. *D. E. Olson, G. A. Dart, and G. F. Filley* 482

SPECIAL COMMUNICATIONS

4 Bile secretion in isolated hamster liver. *J. E. King, S. Oshiba, and L. J. Schoenfield* 495
2 A new instrument for measuring rib movement. *J. Jordanoglou and L. Smith* 501
4 Production of gastric hypersecretion in the rat. *T. T. Vogel, J. A. Jackson, and G. L. Endahl* 505
1, 11 A curious approximate construction for $V_{CE_{max}}$. *E. C. Peirce II, B. B. Kent, R. E. Patterson, and J. Temples* 507

SECTION			PAGE
1	A constrictive and occlusive cuff for medium and large blood vessels.	*G. B. Sham, F. C. White, and C. M. Bloor*	510
9, 11	Tremor analyzer for small laboratory animals.	*R. W. Silverman and D. J. Jenden*	513
1	Artifactual changes in apparent left ventricular compliance due to atrial clamping.	*W. J. Powell, Jr., J. A. Bianco, L. E. Freedberg, R. E. Dinsmore, C. A. Sanders, and W. M. Daggett*	515
1	A catheter electrode technique for study of left ventricular conduction.	*P. O. Ettinger, M. I. Khan, and T. J. Regan*	519
6	Production of gas bubbles in fluids by tribonucleation.	*K. G. Ikels*	524
8, 9	A simple method allowing perfusion of cerebral ventricles of the conscious rabbit.	*A. T. B. Moir and R. C. Dow*	528
1, 7, 10	Platelet count:volume relationships in four mammalian species.	*A. Nakeff and M. Ingram*	530
9	Scanning the interior of living brain by impedography.	*S. Tachibana, J. A. Aguilar, and L. Birzis*	534
9	Effects of preoptic and spinal cord temperature in control of thermal polypnea.	*J. D. Guieu and J. D. Hardy*	540

No. 5. MAY 1970

5, 6, 10	Thyroid and adrenal response to acute cold exposure in man.	*O. Wilson, P. Hedner, S. Laurell, B. Nosslin, C. Rerup, and E. Rosengren*	543
1, 6, 10	Resting levels of fibrinolysis in blood in inactive and exercising men.	*R. T. Moxley, P. Brakman, and T. Astrup*	549
1, 2	Effects of transpulmonary and vascular pressures on pulmonary blood volume in isolated lung.	*D. Y. Rosenzweig, J. M. B. Hughes, and J. B. Glazier*	553
1	Role of carotid chemoreceptors in circulatory response to hypoxia in dogs.	*H. A. Kontos, G. W. Vetrovec, and D. W. Richardson*	561
1, 2, 11	Responses to hypoxia of pulmonary arterial strips in nonaqueous baths.	*T. C. Lloyd, Jr.*	566
1, 2, 11	Effects of O_2 and CO_2 on airway smooth muscle following pulmonary vascular occlusion.	*G. M. Tisi, W. G. Wolfe, R. J. Fallat, and J. A. Nadel*	570
2	Pulmonary function studies in sickle cell disease.	*D. Femi-Pearse, K. Gazioglu, and P. N. Yu*	574
1	Dynamic elastic properties of the aorta in radial direction.	*D. J. Patel, W. K. Tucker, and J. S. Janicki*	578
1, 3	Effect of hemorrhage on blood flow through renal cortex of the dog.	*G. Bell and A. M. Harper*	583
2	Gravity-dependent sequential emptying of lung regions.	*N. R. Anthonisen, P. C. Robertson, and W. R. D. Ross*	589
2	Stress distribution in lungs: a model of pulmonary elasticity.	*J. Mead, T. Takishima, and D. Leith*	596
1, 2	Pulmonary blood flow and resistance during acute atelectasis in intact dogs.	*B. C. Morgan and W. G. Guntheroth*	609
1, 2, 6	Diving bradycardia during rest and exercise and its relation to physical fitness.	*S. B. Strømme, D. Kerem, and R. Elsner*	614
1, 2, 6	Position-dependent regional differences in pericardial pressures.	*P. Avasthey, C. M. Coulam, and E. H. Wood*	622
2, 11	Effect of hypoxia on airway smooth muscle mechanics and electrophysiology.	*N. L. Stephens and E. Kroeger*	630
3, 8, 9	In vivo mass transfer of chloride during exchange hemodialysis.	*H. L. Gabelnick, R. L. Dedrick, and R. S. Bourke*	636
6	Maximal oxygen consumption in a hot environment.	*F. Pirnay, R. Deroanne, and J. M. Petit*	642
6, 10	Effects of hypoxia and hypercapnia, singly and combined, on growing rats.	*W. E. Pepelko*	646
1, 6	Simulated diving during hypoxia in man.	*D. D. Heistad and R. C. Wheeler*	652
5, 6, 11	Repayment of O_2 debt and resynthesis of high-energy phosphates in gastrocnemius muscle of the dog.	*J. Piiper and P. Spiller*	657
2, 6	Effect of inspired P_{CO_2} up to 30 mm Hg on response of normal man to graded exercise.	*S. J. Menn, R. D. Sinclair, and B. E. Welch*	663

SPECIAL COMMUNICATIONS

1, 5, 8	A simple way of estimating turnover rates from specific activity-time curves.	*P. L. Corney and D. F. Heath*	672
2	Direct writeout of total respiratory resistance.	*R. E. Hyatt, I. R. Zimmerman, G. M. Peters, and W. J. Sullivan*	675
2, 11	A modified ballistic method for measuring axial mass displacement caused by breathing.	*W. T. Josenhans and C. S. Wang*	679
2, 8	An improved method for measurement of oxygen consumption at constant oxygen tension.	*J. C. Garrison and G. D. Ford*	685
1, 3, 10	An efficient, simple dialyzer suitable for small animals.	*D. A. Miller*	689
1, 8	An experimental and analytical investigation of an internal cooling technique.	*J. W. Mitchell, G. E. Myers, W. J. Hutchinson, and M. Javid*	695
2, 7	A simple automated recording respirometer.	*D. L. Clayton*	700
1, 9	External vertical cannulation of arteries without available side branches.	*T. Iwabuchi and W. A. Himwich*	702
6, 9, 11	An apparatus for isometric study of the human knee jerk.	*C. M. Davis and D. K. Beale*	705
1, 2	Measurement of mixed venous oxygen tension by a modified rebreathing procedure.	*P. Cerretelli, P. E. Di Prampero, and D. W. Rennie*	707
2, 6	A new type of closed-circuit respirometer suitable for low temperatures.	*E. Pagé and R. Gilbert*	712
2	A method for sampling alveolar gases in awake cats.	*P. Scotto and A. Naitove*	714
1, 5	A technique for prolonged continuous exchange transfusion of unrestrained rats.	*J. P. DeVincenzo and R. E. Beltz*	716

XUM

SECTION PAGE

No. 6. JUNE 1970

2, 9 Respiratory sensitivity of rat brain-stem surface to chemical stimuli. *T. Hori, G. I. Roth, and W. S. Yamamoto* 721
4, 6 Liver function and blood flow at high altitude. *K. Ramsøe, S. Jarnum, R. Preisig, J. Tauber, N. Tygstrup, and H. Westergaard* 725
5, 6 Degradation of albumin and IgG at high altitude. *H. Westergaard, S. Jarnum, R. Preisig, K. Ramsøe, J. Tauber, and N. Tygstrup* 728
1 Mixing and observation errors in indicator-dilution studies. *E. Pavek, K. Pavek, and D. Boska* 733
2, 6, 8 Effects of hypoxia and acetazolamide on color sensitivity zones in the visual field. *J. L. Kobrick* 741
3, 6 Renal responses to various rates of exercise. *W. A. Kachadorian and R. E. Johnson* 748
4 Leucine absorption rate and net movements of sodium and water in human jejunum. *S. A. Adibi* 753
1, 6, 11 Elicitation of heart rate and blood pressure increase on muscle contraction. *U. Freyschuss* 758
6, 11 Effect of exercise on skeletal muscle. I. Biochemical and histochemical properties. *R. J. Barnard, V. R. Edgerton, and J. B. Peter* 762
6, 11 Effect of exercise on skeletal muscle. II. Contractile properties. *R. J. Barnard, V. R. Edgerton, and J. B. Peter* 767
5 Effect of prolonged centrifugation on tissue carbohydrate in fasted rats. *M. H. Harrison* 771
6, 8, 10 Simultaneous measurement of plasma volume and cell mass in polycythemia of high altitude. *C. Sánchez, C. Merino, and M. Figallo* 775
6 Inhibition of sweating by salts of hyoscine and hyoscyamine. *F. N. Craig* 779
2 Ventilation and arterial blood gas changes induced by pursed lips breathing. *R. E. Mueller, T. L. Petty, and G. F. Filley* 784
9 Comparative axon reflex responses in familial dysautonomia. *M. Green and A. A. Smith* 790
1, 2 Pulmonary capillary blood flow waves in subjects with abnormal pulmonary hemodynamics. *A. S. Kaplan and P. Kimbel* 793
9 Cerebral electrical activity during cyclopropane anesthesia in man. *D. L. Clark, B. S. Rosner, and C. Beck* 802
9 Temperature effects on duration and amplitude of distal median nerve action potential. *A. Hlavova, D. I. Abramson, B. Rickert, and J. Talso* 808
6 Evidence of deep-body thermoreceptor response to intra-abdominal heating of the ewe. *R. O. Rawson and K. P. Quick* 813
6 Mechanisms of injury for radiation-induced decrease in cold tolerance. *R. D. Phillips* 821
2 Ventilatory responses of awake normal goats during acute and and chronic hypoxia. *A. H. Mines and S. C. Sørensen* 826
2 Ventilatory responses to acute and chronic hypoxia in goats after sinus nerve section. *S. C. Sørensen and A. H. Mines* 832
2 Ventilatory acclimatization to hypoxia in rabbits after denervation of peripheral chemoreceptors. *S. C. Sørensen* 836

SPECIAL COMMUNICATIONS

1 An analysis of mathematical models of circulatory indicator-dilution curves. *T. R. Harris and E. V. Newman* 840
6 Gas scrubber for a small high-pressure chamber. *R. E. Thompson and T. K. Akers* 851
2 Tracheal fistula in dogs. *S. L. Yankell, R. Marshall, B. Kavanagh, D. P. DePalma, and B. Resnick* 853
1 A method for remote switching to selected sites of variable-frequency cardiac pacing. *E. J. Reininger and E. J. Hinchey* 855
9, 11 Audile monitor for microelectrode experiments. *K. Hermsmeyer and J. M. Downey* 858
4, 11 Electrical stimulation of isolated guinea pig ileum. *A. Scriabine and G. J. Peklak* 860
1, 2 A new method for measurement of cardiac output with nitrous oxide. *B. Ayotte, J. Seymour, and M. B. McIlroy* 863
2, 5, 6 An instrument for continuous measurement of oxygen consumption. *P. Webb and S. J. Troutman, Jr.* 867
9 Measurement of cerebrospinal fluid pressure in the rat. *K. C. Hayes and J. Corey* 872

XUM

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 29, No. 6, December 1970. *Printed in U.S.A.*

Subject Index to Volume 29

Acceleration
  forward, pulmonary blood flow and ventilation, 432
  positive, renal flow response, 244
Acclimation, cold, 385
Acclimatization, altitude, 96
  blood glucose, 560
Acclimatization, cold, women divers, 6
Adaptation, heat and cold, body temperature and oxygen uptake during swimming, 150
Adenosine triphosphate in muscle during exercise, 598
Adrenal gland, degradation of cholesterol during rest and exercise, 323
Aging
  critical temperatures, 556
  muscle strength, lean body mass, and exercise, 168
Airway closure, 332, 340
Airway resistance to two-phase gas-liquid flow, 464
Altitude, effects of changes in on maximal oxygen uptake, 552
Altitude, high
  blood glucose, 560
  exercise, 456
  pulmonary diffusing capacity of natives, 71
  urinary excretion of vanillylmandelic and homovanillic acids during exercise, 51
Alveolar gas exchange, effect of respiratory pattern, 328
Amino acids, free, developmental changes in brain, 219
Ammonium acetate, distribution in muscle and liver vein protein of ^{15}N administered as, 307
Anemia, hypophysectomy, 10
Anesthesia, general, autoregulation of cerebral blood flow, 665
Angina pectoris, nitroglycerin, 17
Aorta
  experimental insufficiency, 538
  root pressure waveforms, 579
Apnea, lung volumes and bradycardia in divers, 172
Arteries
  bronchial, restoration of systemic blood flow to lung after division of, 839
  coronary, effects of nitroglycerin on flow after partial constriction, 17
Atelectasis, pulmonary shunt during hemorrhagic shock, 615
Atrial fibrillation, myocardial tension and pressure variations, 77
Autotransplantation, lung, 587

Bile acid, effect of muscular activity on excretion, 610
Bile salts, absorption from gastric mucosa, 806
Blood flow: *see also* Circulation
  cerebral, effect of general anesthesia on autoregulation of, 665
  coronary collateral, during variable aortic root pressure waveforms, 579
  cutaneous, brain temperature, 698
  effects of nitroglycerin after partial constriction of coronary artery, 17
  forelimb, continuous indicator-dilution measurement, 67
  peripheral, effect of hypothalamic temperature waveforms, 499
  pulmonary, forward acceleration, 432
  renal, response to positive acceleration, 244
  systemic, restoration of to lung after division of bronchial arteries, 839
Blood pressure
  esophageal, 283
  phasic aortic, 579
  variations in atrial fibrillation, 77
Blood viscosity at varying hematocrits in pulmonary circulation, 866
Blood volume reduction by voluntary hyperventilation, 816
Body composition
  hypophysectomy, 10
  skinfold and girth assessment, 313
Body fluids
  shifts in during dehydration in burro, 345
  starvation, 64
Body mass, lean, in old men with different physical activity, 168
Body position, regional pulmonary arterial-venous shunts, 288
Body water, total, of *Macaca nemestrina*, 260
Bradycardia, apneic, lung volumes in divers, 172
Brain
  hypoglycemia and developmental changes in free amino acids, 219
  temperature and cutaneous blood flow, 698
Breathing, vagal blockade, 475
Breathing frequency, heart rate, 350
Burro
  responses to desert heat stress, 159
  shifts in body fluids during dehydration, 345

Calorimetry
  direct, 40
  diurnal patterns, 824
Carbon dioxide
  excretion, 731
  physiological responses to elevated ambient, 32
  pulmonary diffusing capacity for, during exercise, 896
  work limited by inhalation of, 847
Carbon dioxide tension, vagal blockade, 475
Cardiac output
  cold, 417
  computers, 521
  exercise, 82
  single-breath vs. indicator-dilution measurement, 119
  trichromatic ear densitometer for estimation with indocyanine green, 249
Cardiography, impedance, postural stress, 133
Cardiovascular dimensions, moderate physical training, 452
Cardiovascular function, cold stress, 417
Catecholamines, exercise, 374
Children, respiratory compliance, 775
Cholesterol, hepatic and adrenal degradation during rest and exercise, 323
Cineradiography, left ventricular performance, 877, 884
Circadian rhythms, calorimetry, 824
Circulation: *see also* Blood flow
  dependence of oxygen consumption on, in hypovolemia, 440
  exercise, 818
  impairment in rapid decompression, 177
  pulmonary, blood viscosity at varying hematocrits, 866
Conditioning, serum enzymes, 355
Cold
  blood levels of growth hormone, cortisol, and thyrotropin, 622
  central and peripheral sensitivity, 603
  compensatory cardiovascular responses, 417
  peripheral rewarming during exercise in, 191
  thermoregulation, 852
Computer, cardiac excitation, 917
Cooling
  head and neck, exercise effects in heat, 36
  of spinal cord, effects on preoptic unit activity, 675
  preoptic, effects in acclimated rats, 385
  thermal response of legs, 859
Cortisol, effects of cold on blood levels, 622
Creatine phosphate in muscle during exercise, 598
Cycloheximide, production of diamine oxidase by placenta, 684

Dead space, stratified, in lungs, 486
Decompression, rapid, circulatory impairment, 177
Dehydration, shifts in body fluids during, in burro, 345
Diamine oxidase, effect of cycloheximide on production of by placenta, 684
Diurnal patterns, calorimetry, 824
Diving
  calorigenic action of norepinephrine, 6
  lung volumes and apneic bradycardia, 172

Edema, pulmonary, 564
Electrolytes, serum, after marathon running, 449
Electromyogram, biceps, relation to forearm tremor, 103
Electrophysiology, cardiac, 894
Embolism, autologous pulmonary, 670
Energy
  cost of common activities of tropical subjects, 200
  cost of hard work, 570
  mobilization of sources of during exercise, 691

XUM

Enzymes, serum, after marathon running, 355
Epinephrine-^{3}H, myocardial uptake during exercise, 92
Equus asinus, shifts in body fluids during dehydration, 345
Erythropoiesis
  hypophysectomy, 10
  starvation, 64
Esophagus, localization of recording site in, by cardiac artifacts, 283
Exercise
  bile acid excretion, 610
  cardiac output, 82
  circulation, 818
  effects of cooling hood on responses to in heat, 36
  energy cost, 570
  energy cost in heat, 200
  exhaustive, anaerobic muscle metabolites, 598
  external resistance and CO_2 inhalation, 847
  free fatty acid mobilization, 809
  heart rate, 799
  hepatic and adrenal degradation of cholesterol, 323
  high altitude, 456
  intermittent, sweating, 761
  intermittent treadmill, venous blood distribution in legs during, 368
  isometric, fatigue, 358
  maximal, blood glucose and plasma insulin, 13
  maximal $\dot{V}o_2$, ventilation, and heart rate of expert athletes, 186
  mobilization of energy sources, 691
  muscle elasticity, 279
  muscle strength and lean body mass in aging, 168
  myocardial epinephrine-^{3}H uptake, 92
  negative and positive work in climbing a laddermill, 1
  peripheral rewarming during, in cold, 191
  plasma insulin concentrations during prolonged, 155
  plasma lactic dehydrogenase isozymes and catecholamines, 374
  prolonged, serum enzymes after, 355
  pulmonary diffusing capacity for CO, 896
  serum electrolytes, 449
  tidal volume and respiratory rate, 872
  urinary excretion of vanillylmandelic and homovanillic acids at high altitude, 51
  ventilation and heart rate, 208
Exercise, submaximal
  estimation of heart stroke volume from blood hemoglobin and heart rate, 204
  oxygen debt, 547, 651
Exhaustion, external resistance and CO_2 inhalation, 847

Fatigue, isometric contraction, 358
Fatty acids, free
  interactions with glucose in working heart, 87
  mobilization during and after muscular work, 809
Finger
  frostbite, 658
  measurement of strength of, 526
Food, effect of deprivation of on surface activity of lung, 493
Food intake, preoptic cooling, 385
Frostbite, finger, 658

Gases, solubility in red blood cell ghosts, 145
Gastric mucosa, absorption of bile salts, 806
Ghosts, red blood cell, solubility of gases in, 145
Glucagon, coronary and systemic hemodynamic effects, 769
Glucose
  acclimatization to altitude, 560
  blood, in response to maximal exercise and glucose infusion, 13
  interactions with free fatty acids in working heart, 87
Growth hormone, effects of cold on blood levels, 622

Head injury, pulmonary pressure-volume changes, 631
Heart: *see also* entries under Cardiac, Myocardium, Ventricle
  computer study of excitation, 917
  force-velocity-length relationship, 884
  glucose-free fatty acid interactions, 87
  measurement of left ventricular performance by cineradiography, 877, 884
  reflex pulmonary vascular response to distention of left, 318
Heart rate
  breathing frequency, 350
  climbing a laddermill, 1
  dynamics of in response to sinusoidal work load, 208
  estimation of heart stroke volume from at submaximal exercise, 204
  in expert athletes, 186
  muscular contraction, 794
  normal activity, 799
Heart stroke volume, estimation from blood hemoglobin and heart rate at submaximal exercise, 204
Heat
  applied to spinal cord, effects on preoptic unit activity, 675
  central and peripheral sensitivity, 603
  convective transfer coefficient, 830
  effects of cooling hood on physiological responses to work in, 36
  of evaporation of sweat, 40
  relation between $\dot{V}o_{2\,max}$ and body temperature, 45
  responses of burro, 159
  thermoregulation, 852
Helium, narcotic potency, 23
Hematocrit, blood viscosity at varying, 866
Hemodynamics
  coronary and systemic, glucagon, 769
  renal, response to positive acceleration, 244
Hemoglobin, estimation of heart stroke volume from at submaximal exercise, 204
Hemorrhage, atelectatic pulmonary shunt during shock, 615
Homovanillic acid, urinary excretion of in mountain climbing, 51
Hydrogen, narcotic potency, 23
Hypercapnia, vagal blockade, 475
Hyperemia, reactive, reduction in forearm by face immersion, 627
Hypertension, systemic and pulmonary venous, effect on pleural and pericardial fluid accumulation, 564
Hyperthermia, vagal blockade, 475
Hyperventilation, voluntary, reduction of blood volume, 816
Hypoglycemia, developmental changes in free amino acids of brain, 219
Hypophysectomy, relation of red cell mass and energy metabolism to lean body mass, 10
Hypothalamus
  chronically implantable thermode, 508
  effect of temperature waveforms on peripheral blood flow, 499
Hypothermia, increased recovery of respiration after, 58
Hypovolemia, dependence of oxygen consumption on circulation, 440
Hypoxemia, vagal blockade, 475
Hypoxia
  cerebral vasodilatation, 223
  spinal reflex activity, 96
  voluntary response time to peripheral visual stimuli, 444

Ileum, water flux across, 130
Immersion, face, reduction of reactive hyperemia in forearm by, 627
Indicator-dilution measurement, continuous, forelimb blood flow, 67
Indocyanine green
  stability studies, 181
  trichromatic ear densitometer for estimation of cardiac output, 249
Insulin
  plasma concentrations during prolonged work at near maximal oxygen uptake, 155
  plasma, in response to maximal exercise and glucose infusion, 13
Iron clearance rate in starvation, 64

Jejunum, water flux across, 130

Kidney, hemodynamic response to positive acceleration, 244

Lactate in muscle during exercise, 598
Lactic dehydrogenase isozymes, exercise, 374
Legs
  thermal response to cooling, 859
  venous blood distribution in during intermittent treadmill exercise, 368
Liver
  degradation of cholesterol during rest and exercise, 323
  distribution in vein protein of ^{15}N administered as ammonium acetate, 307
Lung: *see also* entries under Pulmonary, Respiration, Ventilation
  atelectatic shunt during hemorrhagic shock, 615
  autologous embolism, 670
  bilateral lavage with hyperbarically oxygenated saline, 786
  blood flow and ventilation during acceleration, 432

compliance at low transpulmonary pressure, 780
contribution of pulmonary stores to oxygen uptake, 230
diffusing capacity of high-altitude natives, 71
effect of food and water deprivation on surface activity, 493
function of autotransplanted, 587
hypertension and fluid accumulation, 564
influence of body position on arterial-venous shunts, 288
models, 531
pressure-volume curves, 422
pulmonary resistance, 236
reflex vascular response to distention of vessels and left heart, 318
regional dispersion of volume-to-ventilation ratios, 480
resistance to two-phase gas-liquid flow in airways, 464
restoration of systemic blood flow to after division of bronchial arteries, 809
site of airway closure, 340
small-airway constriction after microembolism, 646
stratified dead space, 486
topography of pleural surface pressure above resting volume, 297
trapped gas volume, 332
vertical gradient of transpulmonary pressure with active and artificial expansion of, 705
volume, apneic bradycardia in divers, 172

Macaca nemestrina, total body water, 260
Magnesium, serum, after marathon running, 449
Metabolites, muscle, during exercise, 598
Methods and instrumentation
altering plasma cation concentration, 523
angular and linear acceleration of stereotaxically mounted cat, 391
apparatus measuring oxygen consumption and expired CO_2 and $^{14}CO_2$ in small subjects, 731
barometric pressure, 914
calibration and correction of blood O_2 content measured by Po_2 after CO saturation, 413
cardiac output computers, 521
cardiac transmembrane potentials, 894
central arterial pulse waveform monitoring, 911
chronically implantable thermode for hypothalamic temperature, 508
computer study of cardiac excitation, 917
construction of ion-selective glass electrodes by vacuum deposition of metals, 254
continuous blood oxygen analyzer, 398
contractile activity of cells in culture, 892
detection of ventricular premature beats, 541
determination of valvular pressure gradients by visual comparison of areas, 717
direct photosensor measurement of capillary blood cell motion, 517
Doppler and electromagnetic flowmeters, 907
dynamic compliance of left ventricle, 742
effect of anticoagulants on human plasma colloid osmotic pressure measurements, 740
electrooptical monitoring of heart cells, 747
estimation of pressure gradient by differential pressure, 904
FM converter for tape recording of low-frequency biological data, 901
gastric pepsin determinations, 127
generation of sinusoidal fluid pressures of high frequency, 511
globe thermometer, 750
high-fidelity recording of cardiac depolarization, 401
impedance cardiography in study of postural stress, 133
implantation and stabilization of indwelling vascular catheters, 113
lung models, 531
lung perfusion preparation for study of drug metabolism, 138
measurement of intrarenal transit time and hemoglobin saturation by fiberoptics, 123
measurement of O_2 content in microliter blood samples, 414
measuring pulmonary pressure-volume relations, 534
membrane oxygenator for organ perfusion, 758
mercury injection system for small blood sample collection, 528
minimal oxygen consumption, 263
perfusion of sinus node artery, 115
polyvinyl alcohol–heparin hydrogel "G," 723
production of aortic insufficiency, 538
prolonged infusion of unanesthetized and relatively unrestrained rats, 275
psychrometric chart for physiological research, 406
pulmonary diffusing capacity for CO during exercise, 896
radiographic determination of force-velocity-length relationship in heart, 884
rapidly responding oxygen electrode for respiratory gas sampling, 258
repeated bile collection, 111
single-breath and indicator-dilution measurement of cardiac output, 119
small-animal pneumotachograph, 720
thumb strength measurement, 526
time-pulse generator for flow-volume curves, 109
tissue:blood partition coefficient for xenon, 133, 713
torque-free manipulator for concentric micropipets, 395
total body water of *Macaca nemestrina*, 260
trichromatic ear densitometer for estimation of cardiac output with indocyanine green, 249
urine-to-papilla osmotic gradients, 389
variable-frequency cardiac pacing, 889
variable-temperature nerve chamber, 746
water flux across jejunum and ileum, 130
Microembolism, pulmonary, 646
Monkey, pig-tailed, total body water, 260
Muscle
cardiac acceleration induced by voluntary contraction, 794
distribution of ^{15}N administered as ammonium acetate, 307
effect of activity on bile acid excretion, 610
elasticity in exercise, 279
electrical and metabolic activities and fatigue in isometric contraction, 358
free fatty acid mobilization after work, 809
sinusoidal and trapezoidal force, 378
strength in old men with different physical activity, 168
working, lactate, ATP, and creatine phosphate, 598
Myocardium
contractility, 637
epinephrine-^3H uptake during exercise, 92
solubility of nitrous oxide, 593
tension in atrial fibrillation, 77

Naphthalene, evaluation of convective heat transfer coefficient by sublimation of, 830
Narcosis, relative potencies of hydrogen, helium, nitrogen, and their mixtures, 23
Nerves, vagus, blockade of and breathing regulation, 475
Newborn, hyperbaric oxygen toxicity, 472
Nitrogen
heavy, in man, 307
narcotic potency, 23
Nitroglycerin, effects on flow after partial constriction of coronary artery, 17
Nitrous oxide, solubility in biologic fluid and myocardium, 593
Norepinephrine, calorigenic action in women divers, 6

Oxygen
effects of altitude changes on maximal uptake, 552
hyperbaric toxicity in newborn and developing mice, 472
Oxygen consumption
climbing a laddermill, 1
dependence on circulation in hypovolemia, 440
exercise, 570
high altitude, 456
measurement, 731
minimal, 263
Oxygen debt
exercise, 847
submaximal exercise, 547, 651
Oxygen intake, maximal, relation to body temperature in humid heat, 45
Oxygen uptake
contribution of pulmonary stores, 230
in warm- and cold-adapted rats during swimming, 150
maximal, in expert athletes, 186
plasma insulin concentrations during prolonged work at near maximal, 155

Pepsin, gastric, 127
Placenta, effect of cycloheximide on production of diamine oxidase, 684

Potassium, serum, after marathon running, 449
Preoptic unit activity, effects of heating and cooling of spinal cord, 675
Pressure-volume relations
air- and liquid-filled lungs, 422
changes in head injury, 631
measuring, 534
Pulmonary diffusing capacity
for CO during exercise, 896
high-altitude natives, 71

Red blood cell ghosts, solubility of gases in, 145
Respiration
exercise, 839
increased recovery after hypothermia, 58
pattern of, and alveolar gas exchange, 328
responses to elevated ambient CO_2, 32
Respiratory compliance
children, 775
low transpulmonary pressure, 780

Saline, hyperbarically oxygenated, bilateral lung lavage with, 786
Shock, hemorrhagic, atelectatic pulmonary shunt, 615
Shunting, atelectatic pulmonary, during hemorrhagic shock, 615
Spinal cord
effects of heating and cooling on preoptic unit activity, 675
reflexes during hypoxia, 96
Starvation, iron clearance rate and body fluid volumes, 64
Stress
cold, compensatory cardiovascular responses, 417
heat, responses of burro, 159
hydrostatic, effect of ambient temperature on venous reactivity, 54
postural, impedance cardiography, 133
Sweat
central and peripheral stimuli regulating, during intermittent work, 761
heat of evaporation, 40
thermal, effects of water intake on composition, 687
Swimming, body temperature and oxygen uptake in warm- and cold-adapted rats, 150

Temperature
air, finger freezing, 658
ambient, venous reactivity to hydrostatic stress, 54
brain, cutaneous blood flow, 698
critical, individual differences at various ages, 556
Temperature, body
oxygen uptake in warm- and cold-adapted rats during swimming, 150
relation to $\dot{V}O_{2\ max}$ in humid heat, 45
Temperature, hypothalamic
chronically implantable thermode, 508
peripheral blood flow, 499
Temperature regulation: *see* Thermoregulation
Thermometer, globe, 750
Thermoregulation
brain temperature, 698
central and peripheral thermosensitivity, 603
during exercise in cold, 191
heat and cold stress, 852
preoptic area, 675
preoptic cooling, 385
Thrombus, autologous pulmonary, 670
Thumb, measurement of strength of, 526
Thyrotropin, effects of cold on blood levels, 622
Training, cardiovascular dimensions, 452
Trauma, head, pulmonary pressure-volume changes, 631
Tremor, forearm, relation to biceps EMG, 103

Vagal blockade, breathing regulation, 475
Vanillylmandelic acid, urinary excretion of in mountain climbing, 51
Vasodilatation, cerebral, in hypoxia, 223
Ventilation
dynamics of in response to sinusoidal work load, 208
exercise, 475, 872
forward acceleration, 432
in expert athletes, 186
regional, 480
Ventricle, left
cineradiography, 877, 884
dynamic compliance, 742
peak measured velocity of shortening, 637
Visual perception, hypoxia, 444

Water
effect of deprivation of on surface activity of lung, 493
effects of intake of on composition of thermal sweat, 687
Work load, sinusoidal, ventilation and heart rate, 208

Xenon 133, tissue:blood partition coefficient, 713

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 29, No. 6, December 1970. *Printed in U.S.A.*

Author Index to Volume 29

Adams, T., 852
Adams, W. S., 534
Agarwal, J. B., 866
Agostoni, E., 297, 705
Alexander, J. A., 769
Alippi, R. M., 10
Amorim, D. deS., 288
Amundsen, D. A., 615
Anderson, G. J., 401
Apgar, W. P., 32
Ashford, T. P., 723
Auchincloss, J. H., Jr., 119, 230
Austen, W. G., 723

Bache, R. J., 769
Bachofen, H., 422
Bachofen, M., 422
Bainton, C. R., 475
Baker, P. T., 560
Balagot, R. C., 775
Bandelin, V. R., 775
Bandura, J. P., 401
Banerjee, B., 200
Banet, N., 385
Barner, H. B., 398
Barnes, C. D., 96
Barrionuevo, J. A., 10
Bartlett, R. H., 758
Bass, A. D., 138
Baule, G. H., 230
Bazaral, M., 113
Bean, J. W., 631
Beaver, W. L., 872
Beckman, D. L., 631
Behar, M. G., 413
Bell, S., 806
Benade, A. J. S., 45
Berg, K., 191
Berger, E. Y., 130
Bernauer, E. M., 172
Berthoz, A., 378
Birndorf, N. I., 573
Blackmore, D., 556
Blenkarn, G. D., 786
Blevins, W. V., 847
Blomqvist, G., 742
Bloor, C. M., 670
Bonanni, N. V., 328
Bouman, L. N., 794
Bousser, J. E., 355
Bove, A. A., 877, 884
Bozzini, C. E., 10
Brauer, R. W., 23
Briggs, E. M., 396
Brody, J. S., 587, 839
Broome, L. A., 824
Brown, A. C., 499
Brown, A. H., 723
Brown, B. G., 579
Bruell, J. H., 92
Bruno, O. D., 622
Bühlmann, A. A., 816
Bullard, R. W., 159
Burdeshaw, J., 717
Bush, J. E., 133
Buskirk, E. R., 560
Busto, R., 223

Cage, G., 687
Calanog, A. M., 684
Caldwell, W. M., 901
Carrico, C. J., 615
Carroll, D. R., 449
Cavagna, G. A., 279
Cerretelli, P., 204, 547
Chambers, A. B., 406
Chimoskey, J. E., 244
Clarke, S. W., 464, 646
Clements, J. A., 780
Connors, T. J., 374
Constantinou, C. E., 396
Cooper, K. H., 355, 449
Copinschi, G., 622
Cox, R. H., 904
Craig, F. N., 847
Cramer, D. B., 799
Crass, M. F. III, 87
Cubina, J. M., 593
Cummings, E. G., 847
Curry, C. L., 769

Dahms, T. E., 417
D'Angelo, E., 297
Danon, J., 775
Davies, C. T. M., 547
Davis, J. M., 219
Dawson, C. A., 150, 603
Dean, E. E., 111
DeGraff, A. C., Jr., 71
De Lattre, J., 818
Demuth, G. R., 328
DenBesten, L., 806
Denckla, W. D., 263
Diamond, L., 720
Dill, D. B., 159, 345, 456, 914
Di Prampero, P. E., 547
Doležal, V., 51
Doman, J., 249
Drinker, P. A., 758
Druz, W. S., 775
Dusek, E. R., 444
Dýcka, J., 168

Ecker, R. R., 742
Eisman, M. M., 531
Ekblom, B., 82
Eknoyan, G., 123
Elsner, R., 627
Evans, D. S., 914
Evans, J. S., 275
Evonuk, E., 374

Faridy, E. E., 493
Feezor, M. D., 541
Fisch, C., 401
Fisher, A. B., 587, 839
Fishman, A. P., 564
Foreman, J. E. K., 511
Fox, J. R., 103
Franklin, D., 907
Frazer, D. G., 534
Frick, M. H., 452
Friedman, J. N., 839
Friedman, S. M., 254
Friesen, W. O., 258

Fujishima, M., 223
Fürst, P., 307

Gagge, A. P., 830
Gaisford, W. D., 911
Galvez, T. L., 859
Gardner, R. M., 911
Gathje, J., 181
Gelband, H., 894
Gentz, J., 731
Gienapp, E. M., 526
Giere, F. A., 13
Gilbert, R., 119, 230
Girandola, R. N., 313
Gisolfi, C., 368, 761
Glagov, S., 799
Glaister, D. H., 432
Goetting, J. A., 824
Goldman, R. F., 570, 658
Golstein-Golaire, J., 622
Gooden, B. A., 627
Gordon, R., 687
Gott, V. L., 579
Graf, P. D., 646
Green, H. D., 17
Greenfield, J. C., Jr., 769
Greenspan, K., 401
Grover, R. F., 71
Guieu, J. D., 675
Guignard, J.-P., 254
Gundel, W. D., 579

Haddy, F. J., 523
Hakkarainen, J., 731
Hall, H., 395
Halmagyi, D. F. J., 440
Hamburger, R. N., 113
Hamilton, L. H., 186
Hammond, J. W., Jr., 71
Han, D. S., 6
Hankinson, J. L., 109
Hansell, J., 839
Hardy, J. D., 675
Harrison, D. C., 747
Hartley, L. H., 818
Hayes, J. A., 786
Hechtman, H. B., 528
Hegmann, J. P., 746
Hellerstein, H. K., 92
Hellstrøm, B., 191
Hengle, J., 859
Henry, P. D., 670
Herman, A. H., 528
Hermansen, L., 13, 82
Heyns, A. J., 45
Hiatt, W. R., 172
Hickey, R. F., 475
Hildebrandt, J., 422
Hillman, H., 58
Himwich, W. A., 219
Hinchey, E. J., 889
Hirsch, E. Z., 92
Hoffman, B. F., 115, 894
Hoffman, J. C., 665
Hoggendal, J., 818
Hollander, A. P., 794
Holmes, K. R., 852
Hong, S. K., 6, 172

Hoover, W. H., 32
Horvath, S. M., 150, 417, 456, 603
Howatt, W. F., 328
Hughes, A. L., 570
Hughes, J. M. B., 332, 340
Hunter, W. S., 852
Hutchison, K. J., 511
Hyde, R. W., 587, 839

Ingram, D. L., 698
Intaglietta, M., 740
Isaacson, L. C., 395
Issekutz, A. C., 691
Issekutz, B., Jr., 691
Ivey, K. J., 806

Jackson, D., 717
Jellinek, M., 398
Johnson, R. L., Jr., 71
Jones, J. G., 464
Jonsson, A., 307
Josephson, B., 307
Judy, A. B., 901
Justice, R. E., 528

Kaiser, G. C., 398
Kamon, E., 1
Kang, B. S., 6
Kanzaki, G., 130
Karlsson, J., 598
Kastella, K. G., 499, 508
Katori, R., 288
Kaufman, W. C., 177
Kazemi, H., 486
Kennedy, M., 440
Kim, C. S., 6
Kim, J. K., 6
Kirsten, E. B., 391
Kivitz, P. B., 340
Klausen, K., 456
Klissouras, V., 358
Knelson, J. H., 328
Knudson, R., 236
Knuttgen, H. G., 651
Kobrick, J. L., 444
Kodama, A. M., 260
Kofoed, J. A., 10
Kogure, K., 223
Kollmeier, H., 839
Kozam, R. L., 593
Krayenbuehl, H. P., 637
Kroemer, K. H. E., 526
Kuehn, L. A., 750
Kuroda, E., 358
Kuta, I., 168

Laastuen, L., 323, 610
Lackey, W. W., 824
Lacour, J., 818
Landau, S. M., 593
Lapp, N. L., 109
Lawson, W. H., Jr., 896
Leclercq, R., 622
Leith, D. E., 236
Levine, B. W., 486
Levine, O. R., 564
Licking, J. H., 391
Lindstedt, S., 731

XUM

Lipscomb, W., 720
Lloyd, T. C., Jr., 318
Lockhart, B., 186
Lopas, H., 573
Lowe, S. L., 449
Luff, R. H., 713
Lukas, D. S., 593
Luxa, J., 51
Lynch, P. R., 877, 884

Macklem, P. T., 236
Mahler, Y., 77
Maksud, M. G., 186
Malindzak, G. S., Jr., 17
Malinow, M. R., 323, 610
Margaria, R., 204, 547
Martin, C. J., 480
Martin, P. J., 917
Martinez-Maldonado, M., 123
Marty, A. T., 740
Mayes, M. G., 345
McCaskill, E. S., 87
McHale, P. A., 769
McIlroy, M. B., 258
McLaughlin, P., 323, 610
Mead, J., 236
Mehmel, H., 637
Mellins, R. B., 564
Merrill, E. W., 723
Metral, S., 378
Meyer, J. R., 746
Miller, H. A., 747
Miller, J. M., 71
Mills, R. J., 521
Milsum, J. H., 358
Miserocchi, G., 705
Mishr, S., 684
Mitchell, D., 40
Mitchell, J. H., 742
Mitchell, J. W., 859
Moody, D. L., 313
Moore, T. O., 172
Moran, F., 521
Morgan, M. L., 852
Myerburg, R. J., 115, 894
Myers, G. E., 859

Nadel, E. R., 603
Nadel, J. A., 475, 646
Nash, D., 691
Neigh, J. L., 665
Newberry, P. D., 54
Nicholes, K. R. K., 181
Niki, I., 417
Niotti, H. F., 10
Nishi, Y., 830
Noyes, B. S., 758

Oliver, D. R., 464
Osnes, J. B., 13
Ostrowski, D., 123
Overbeck, H. W., 67

Page, R. G., 799
Paik, K. S., 6
Pajunen, S., 452
Palmer, W. H., 249, 866
Paltoo, R., 866
Parízková, J., 168
Park, C. D., 587
Park, H. K., 172
Park, Y. S., 6
Pecikyan, R., 130
Pederson, V. C., 219
Peeters, R., 283
Peräsalo, J., 452
Perley, A., 323, 610
Pernow, B., 818
Persson, B., 731
Peterson, E. W., 449
Petro, J. K., 794
Phillipson, E. A., 475
Picon-Reategui, E., 560
Piwonka, R. W., 96
Polanyi, M. L., 123
Potanin, C., 717
Power, G. G., 145
Pratt, A. J., 177
Pruett, E. D. R., 13, 155, 809

Rabinowitz, L., 389
Randall, J. E., 103
Raven, P. B., 374, 417
Reininger, E. J., 889
Reinmuth, O. M., 223
Rennie, D. W., 6
Rhoades, R. A., 534
Robinson, S., 368, 761
Roemer, R. B., 150
Rogel, S., 77
Rogers, G. G., 552
Rogers, P. D., 58
Rose, L. I., 355, 449
Rosenbloom, P. M., 138
Rosendorff, C., 713
Rosenzweig, D. Y., 332, 340
Ross, S. M., 391, 894
Rowe, G. G., 538
Rowley, D. A., 799
Rutishauser, W., 637

Saha, N., 200
Saltin, B., 82, 598, 818
Salzano, J., 350
Salzman, E. W., 723
Salzman, S. H., 92
Sasser, L. B., 64
Sawyer, M. S., 32
Schanne, O. F., 892
Scheinberg, P., 223
Schneider, A. J. L., 318
Schuhmann, R. E., 111
Scott, J. B., 523
Seguin, J. J., 385
Sekelj, P., 249
Seto, G., 172
Severinghaus, J. W., 413, 615
Shankar, K. R., 249
Sharp, J. T., 775
Shipp, J. C., 87
Shvartz, E., 36
Siebecker, K. L., 859
Sinclair, A. J., 747
Sjögren, A.-L., 452
Smith, A. L., 665
Smith, J. J., 133
Smith, R. El., 698
Snellen, J. W., 40
Sobel, B. E., 670
Southren, A. L., 684
Sperling, D. R., 472
Spring, D. A., 538
Stacy, R. W., 541
Stagg, P. L., 17
Stegall, H., 145
Stegall, H. F., 177
Steuer, R. R., 181
Stewart, J. W., 115
Stiller, P. F., 517
Stone, H. L., 171
Straub, P. W., 816
Strieder, D. J., 486
Strydom, N. B., 45, 552
Stubbs, R. A., 750
Suda, Y., 480
Suki, W. N., 123
Sukumar, I. P., 249
Sundy, M., 127

Tazawa, H., 414
Templeton, G. H., 742
Theye, R. A., 288
Thompson, R., 687
Tierney, D. F., 780
Tomlinson, S. J., 111
Tomlinson, W. M., 111
Toronto, A. F., 911
Tristani, F. E., 133
Trop, D., 283
Trummer, M. J., 615
Tucker, A., 603

VanCitters, R. L., 907
Van de Woestijne, K. P., 283
Vanhaelst, L., 622
Van Hook, E., 323
Van Rensburg, A. J., 45, 552
Vatner, S. F., 907
Vaughan, D. A., 824
Veicsteinas, A., 204
Vincent, N. J., 236
Vinnars, E., 307
Vitikainen, K. J., 115
Vogt Lorentzen, F., 191

Wade, L., Jr., 64
Wahrenbrock, E. A., 615
Waldhausen, J. A., 587, 839
Walker, F. E., 123
Wallace, A. G., 541
Warner, H. R., 911
Wasserman, K., 872
Way, R. O., 23
Weaver, R. S., 750
Weingold, A. B., 684
Wenger, J., 127
Whiting, M. E., 901
Wiedmeier, V. T., 133
Wiess, H. R., 350
Wigertz, O., 208
Wiley, R. L., 186
Wilmore, J. H., 313
Wilson, O., 658
Wolf, J., 51
Wolfe, S., 687
Wollman, H., 665
Wolthuis, R. A., 67
Wong, P. S. L., 723
Wood, E. H., 288
Wyndham, C. H., 40, 45, 552

Young, A. C., 480
Young, P. J., 32
Young, S. L., 780
Yousef, M. K., 159, 345

Journal of APPLIED PHYSIOLOGY

VOLUME 29 *July–December 1970*

EDITORIAL BOARD

SECTION EDITORS

Circulation—D. F. Bohr; Theodore Cooper; W. C. Randall
Respiration—L. E. Farhi; Solbert Permutt
Renal and Electrolyte Physiology—W. B. Kinter; E. E. Windhager
Gastrointestinal Physiology—P. F. Curran
Endocrinology and Metabolism—B. R. Landau; F. E. Yates
Environmental Physiology and Exercise—J. D. Hardy
Comparative and General Physiology—C. L. Prosser
Neurobiology—V. B. Brooks
Hematology—O. D. Ratnoff
Muscle Physiology—F. N. Briggs; C. L. Prosser

Eugene Ackerman
E. F. Adolph
T. H. Allen
M. E. Avery
C. H. Baker
Arend Bouhuys
Alvin Brodish
E. R. Buskirk
John Butler
L. D. Carlson
C. A. Chidsey
R. F. Coburn
C. R. Collier
Burton Combes
F. N. Craig
Gordon Cumming
W. J. Daly
J. M. Davidson
D. L. Davis
J. M. Dietschy
J. H. Dirks
H. A. Eder
Charles Edwards
A. N. Epstein
J. N. Fain
E. O. Feigl
R. P. Forster
J. G. Forte
H. A. Fozzard
D. L. Franklin
A. P. Gagge
D. S. Gann
Gerhard Giebisch
J. P. Gilmore
H. M. Goodman
F. S. Grodins
N. S. Halmi
Denman Hammond
A. E. Harper
Arthur Haut
R. J. Havel
E. W. Hawthorne
J. A. Herd
T. F. Hornbein
Paul Horowicz
S. M. Horvath
R. E. Hyatt
H. D. Janowitz
K. E. Jochim
A. M. Katz
Joseph Katz
Robert Katzman
Paul Kezdi
L. B. Kirschner
F. J. Klocke
G. A. Langer
H. D. Lauson
Claude Lenfant
Nathan Lifson
L. S. Lilienfield
R. D. Lisk
T. C. Lloyd
P. T. Macklem
R. L. Malvin
J. M. Marshall
S. E. Mayer
M. B. McIlroy
K. L. Melmon
Joseph Milic-Emili
R. A. Mitchell
H. E. Morgan
Q. R. Murphy
J. A. Nadel
Arnold Naimark
N. M. Nelson
Jack Orloff
Simon Ostrach
Nello Pace
J. R. Pappenheimer
B. D. Polis
Sid Robinson
P. S. Roheim
J. C. Ross
John Ross, Jr.
Irving Rothchild
S. S. Rothman
George Sachs
A. M. Scher
Knut Schmidt-Nielsen
S. G. Schultz
E. E. Selkurt
R. A. Shipley
William Sleator, Jr.
E. E. Smith
J. A. J. Stolwijk
R. V. Talmage
D. F. Tierney
Frank Ulrich
John Urquhart
H. D. Van Liew
A. G. Wallace
W. H. Waugh
John West
Saul Winegrad
M. B. Zucker

PUBLICATIONS COMMITTEE, AMERICAN PHYSIOLOGICAL SOCIETY

D. S. Fredrickson, *Chairman* P. F. Curran Jere Mead

Sara F. Leslie, *Publications Manager and Executive Editor*
W. A. Sonnenberg, *Business Manager* Judith P. Bloomer, *Copy Editor*

AMERICAN PHYSIOLOGICAL SOCIETY 9650 Rockville Pike, Bethesda, Md. 20014

XUM

COPYRIGHT © 1970, BY
THE AMERICAN PHYSIOLOGICAL SOCIETY, INC.

PRINTED IN THE UNITED STATES OF AMERICA
BY WAVERLY PRESS, INC., BALTIMORE, MARYLAND

XUM

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 29, No. 6, December 1970. *Printed in U.S.A.*

Guest Referee Editors

The Publications Committee of the American Physiological Society gratefully acknowledges the services of the following guest referee editors who assisted the Editorial Board in the review of papers published in this volume of the Journal.

B. C. Abbott
F. Abboud
R. M. Abrams
T. Adams
W. R. Adey
R. W. Albers
R. Albert
N. Alexander
R. S. Alexander
B. Anders
H. Andersen
O. S. Andersen
M. Anliker
N. R. Anthonisen
J. T. Apter
T. S. Argyris
B. Armstrong
L. Aronow
E. Attinger
S. Baez
B. B. Balke
W. C. Ball, Jr.
N. Bank
L. Barr
C. A. Barraclough
J. B. Bassingthwaighte
D. Bates
J. W. Bean
M. R. Becklake
A. R. Behnke
H. S. Belding
H. Bendixen
R. Benesch
J. C. Benton
W. H. Bergstrom
N. I. Berlin
M. Berman
L. Bernstein
S. Bessman
J. L. Bethune
A. Bill
B. Bishop
B. Bloor
A. Bortoff
R. Bowman
S. Boyarsky
A. Brady
P. O. Bramante
M. A. B. Brazier
G. Brecher
B. M. Brenner
K. M. Brinkhous
W. A. Briscoe
D. A. Brody
M. J. Brody
T. M. Brody
A. C. Brown
E. Brown
E. B. Brown
K. Brown-Grant
R. A. Bruce
D. E. Buetow
K. J. Buettner
B. S. Bull
R. W. Bullard
B. Burrows
A. C. Burton
G. F. Cahill
F. T. Caldwell
E. J. M. Campbell
P. Cannon
C. G. Caro
S. Carriere
J. Casby
S. E. Charms
V. Chernick
F. P. Chinard
H. N. Christensen
J. Christensen
L. C. Clark, Jr.
D. Clarke
J. A. Clements
M. Clifford
B. Coleman
V. Collins
C. L. Comar
G. E. Combs
J. Connor
R. Conrad
J. Conway
E. Cotzias
J. W. Covell
A. B. Craig, Jr.
E. P. Cronkite
W. Crosley
D. J. C. Cunningham
A. Damon
H. W. Davenport
J. O. Davis
P. W. Davis
P. Deetjen
P. Dejours
R. Dell
W. Dement
J. J. Deren
R. L. Detar
D. B. Dill
P. B. Dobrin
V. H. Donaldson
J. Dorn
J. Douglas
W. Douglas
P. Dow
H. F. Downey
A. B. DuBois
B. Duling
L. E. Early
H. M. Eberhart
R. E. Eckel
R. W. Eckstein
S. Ehrenpreis
K. B. Eik-Ness
G. Eisenman
F. H. Epstein
S. E. Epstein
D. F. Evans
E. Evarts
J. Faulkner
H. Feinberg
B. C. Ferris, Jr.
A. P. Fishman
R. S. Fitzgerald
J. H. Fleisch
R. Fleming
G. E. Folk
E. L. Forker
R. E. Forster
N. Fowler
W. Fowler
I. J. Fox
R. A. Freedland
W. Fried
H. Frischer
M. J. Frumin
H. H. Fudenberg
C. C. Gale
P. Galletti
W. F. Ganong
L. A. Geddes
A. Gellhorn
L. Gertz
W. Gesterland
A. M. Gittelsohn
G. Glick
E. Goldensohn
D. E. Goldman
R. F. Goldman
S. Goldring
H. Goldsmith
D. S. Goodman
R. Gorlin
V. Gott
C. W. Gottschalk
H. D. Green
J. C. Greenfield, Jr.
H. Grundfest
W. G. Guntheroth
A. C. Guyton
T. Hammel
J. P. Hannon
A. S. Harris
S. C. Hartman
A. B. Hastings
A. Hauge
T. Hayashi
L. L. Hefner
S. R. Heisey
E. Hendler
A. Henschel
B. Hertig
J. Hildebrandt
P. Hirsch
B. Hirschowitz
J. P. Hoare
H. Hoff
C. R. Honig
S. Hoobler
F. Hoppin
A. Hsieh
B. Issekutz, Jr.
D. Jackson
E. Jacobson
J. Jacquez
M. Jaeger
T. N. James
J. Jamieson
P. C. Johnson
R. E. Johnson
M. Johnston
R. T. Jones
N. Kahn
G. A. Kaiser
G. Kaley
P. V. Karpovich
M. Kashgarian
G. M. Katz
R. H. Kellogg
A. Keys
D. V. Kimberg
D. M. Kipnis
E. S. Kirk
J. E. Kirk
V. Klig
D. Kline
C. Kochakian
G. Koelle
R. C. Kory
M. E. Krahl
W. G. Kubicek
P. Kuo
J. A. Kylstra
P. Lacy
A. Lajtha
C. J. Lambertsen
W. Landau
A. J. Lande
W. H. Langham
E. H. Lanphier
H. Lanson
W. E. Lassiter
D. P. Lauler
J. M. Lauweryns
M. Laver
A. Lefer
D. E. Leith
M. Leon
G. Leville
R. J. Levone
J. E. Levy
M. Levy
B. M. Lewis
J. E. Lewy
W. Lick
A. R. Lind
M. B. Lipsett
M. Litt
C. W. Lloyd
H. B. Lofland
I. London
I. S. Longmuir
H. L. Lucas
T. Maack
M. Mager
C. Mangum
S. Margolis
L. Marks
W. Marshall
D. Marsland
D. T. Mason
Y. Matsumoto
D. Maurice
A. Mauro
R. Maxwell
D. A. McDonald
H. D. McIntosh
H. W. Mergler
J. Merideth
J. P. Merrill
J. Metcalfe
T. Miller
W. R. Milnor
D. Minard
J. W. Mitchell
D. Mohrman
G. W. Molnar
W. F. H. M. Mommaerts
F. Moody
A. G. Morrow
H. Mueller-Eberhart
J. R. Murphy
R. H. Murray
A. V. Nalbandov
H. Navert
C. S. Nicoll
P. A. Nicoll
A. Nidel
Y. Nishi
F. Noble
H. Nossel
W. Obrist
G. C. Offutt
J. Osborn
A. Otis
C. V. Paganelli
W. Palmer
S. S. Park
L. D. Partridge
D. J. Patel
J. A. Patterson
H. D. Patton
L. D. Peachey
E. Perl
H. M. Perry
R. Peterson
C. Pfaffman
G. Pickford
A. Pinkerson
R. F. Pitts
R. S. Pope
V. Popovic
D. Porte
G. G. Power
K. Pribam
D. V. Priola

XUM

D. F. Proctor
E. P. Radford, Jr.
D. Rall
C. Rapela
G. M. Rapp
R. O. Rawson
O. K. Reiss
R. J. Reiter
J. W. Remington
E. Renkin
R. L. Riley
K. C. Robbins
J. Roberts
J. S. Robertson
E. D. Robin
C. Rosendorff
H. Rosomoff
C. R. Ross
G. Ross
C. F. Rothe
L. B. Rowell
J. Rudick
A. M. Rudolph
R. Ryall
K. Sagawa
S. I. Said
G. M. Saidel
P. Saltman
H. A. Saltzman
H. Sandler
K. E. Schaefer
R. W. Schayer
H. P. Schedl
D. Scherf
R. Schimmel
G. Schoepfle
P. F. Scholander
B. A. Schottelius
R. Schroter
K. Schulman
A. Schwartz
W. B. Schwartz
S. Segal
J. W. Severinghaus
L. S. Shanker
G. D. Sharp
J. T. Shepherd
R. L. Sidman
A. A. Siebens
P. H. Sih
D. Simmons
C. R. Smith
O. L. K. Smith
R. Smith
T. Smith
F. M. Snell
K. Soergel
L. Sokoloff
S. Solomon
R. R. Sonnenschein
M. Spach
T. Spaet
W. A. Spencer
N. Sperelakis
W. Stainsby
N. C. Staub
S. Steelman
F. R. Steggerda
M. Stein
S. Steinberg
P. R. Steinmetz
J. Stephenson
J. C. Stevens
J. Stitt
D. Stuart
B. Surawicz
K. Suwa
H. J. Swan
A. Szent-Gyorgyi
J. P. Szidon
G. Tanner
A. E. Taylor
M. Taylor
C. Tidball
D. C. Tosteson
R. Travis
J. Trier
V. Tucker
A. R. Twardock
B. Vallee
J. VanBruggen
A. Van Harreveld
J. Van Pilsum
R. Van Reen
S. Vatner
H. Von Gierke
L. Vroman
M. Walser
R. P. Walton
S. C. Wang
G. Warner
K. Wasserman
H. Wayland
L. Webster
J. Weeks
I. Weiner
N. Weiner
W. J. Whalen
G. C. Whittow
C. A. Wiederhielm
R. D. Williams
J. S. Willis
V. L. Willman
M. F. Wilson
V. Wilson
F. H. Wilt
M. L. Wolbarsht
S. G. Wolf
E. Wood
E. Wright
F. S. Wright
R. D. Wurster
L. Zablow
K. L. Zierler
D. Zilversmit
W. F. Zimmerman
I. Zucker
B. W. Zweifach

JOURNAL OF APPLIED PHYSIOLOGY
Vol. 29, No. 6, December 1970. *Printed in U.S.A.*

Contents of Volume 29

Key to Sections:
1. Circulation
2. Respiration
3. Renal & Electrolyte Physiology
4. Gastrointestinal Physiology
5. Endocrinology & Metabolism
6. Environmental Physiology & Exercise
7. Comparative Physiology
8. General Physiology
9. Neurobiology
10. Hematology
11. Muscle Physiology

No. 1. JULY 1970

SECTION			PAGE
6, 11	Negative and positive work in climbing a laddermill.	*E. Kamon*	1
5, 6	Calorigenic action of norepinephrine in the Korean women divers.	*B. S. Kang, D. S. Han, K. S. Paik, Y. S. Park, J. K. Kim, C. S. Kim, D. W. Rennie, and S. K. Hong*	6
5, 10	Relationship of red cell mass and energy metabolism to lean body mass in hypophysectomized rats.	*C. E. Bozzini, J. A. Kofoed, H. F. Niotti, R. M. Alippi, and J. A. Barrionuevo*	10
5, 6	Blood glucose and plasma insulin in response to maximal exercise and glucose infusion.	*L. Hermansen, E. D. R. Pruett, J. B. Osnes, and F. A. Giere*	13
1	Effects of nitroglycerin on flow after partial constriction of the coronary artery.	*G. S. Malindzak, Jr., H. D. Green, and P. L. Stagg*	17
2, 6, 8	Relative narcotic potencies of hydrogen, helium, nitrogen, and their mixtures.	*R. W. Brauer and R. O. Way*	23
6, 8	Ovine physiological responses to elevated ambient carbon dioxide.	*W. H. Hoover, P. J. Young, M. S. Sawyer, and W. P. Apgar*	32
1, 6	Effect of a cooling hood on physiological responses to work in a hot environment.	*E. Shvartz*	36
6	Heat of evaporation of sweat.	*J. W. Snellen, D. Mitchell, and C. H. Wyndham*	40
6, 11	Relation between $Vo_{2\ max}$ and body temperature in hot, humid air conditions.	*C. H. Wyndham, N. B. Strydom, A. J. van Rensburg, A. J. S. Benade, and A. J. Heyns*	45
6	Urinary excretion of vanillylmandelic and homovanillic acids in mountain climbing.	*J. Wolf, V. Doležal, and J. Luxa*	51
1, 6, 8	Effect of ambient temperature on venous reactivity to hydrostatic stress.	*P. D. Newberry*	54
1, 2	Increased recovery of rats' respiration following profound hypothermia.	*P. D. Rogers and H. Hillman*	58
1, 8, 10	Effects of acute starvation on iron clearance rate and body fluid volumes in sheep.	*L. Wade, Jr., and L. B. Sasser*	64
1	Continuous infusion indicator-dilution measurement of blood flow in the dog forelimb.	*H. W. Overbeck and R. A. Wolthuis*	67
2, 6	Diffusing capacity of the lung in Caucasians native to 3,100 m.	*A. C. DeGraff, Jr., R. F. Grover, R. L. Johnson, Jr., J. W. Hammond, Jr., and J. M. Miller*	71
1	Computer analysis of myocardial tension and pressure variations in atrial fibrillation.	*Y. Mahler and S. Rogel*	77
1, 6	Cardiac output during submaximal and maximal treadmill and bicycle exercise.	*L. Hermansen, B. Ekblom, and B. Saltin*	82
5, 6, 11	Glucose-free fatty acid interactions in the working heart.	*M. F. Crass III, E. S. McCaskill, and J. C. Shipp*	87
1, 5, 6	Adaptation to muscular exercise: myocardial epinephrine-^{3}H uptake.	*S. H. Salzman, E. Z. Hirsch, H. K. Hellerstein, and J. H. Bruell*	92
6, 9	Spinal reflex activity during acute hypoxia in normal and chronic altitude-exposed cats.	*R. W. Piwonka and C. D. Barnes*	96
9	Relationship between forearm tremor and the biceps electromyogram.	*J. R. Fox and J. E. Randall*	103

SPECIAL COMMUNICATIONS

2	Time-pulse generator for flow-volume curves.	*J. L. Hankinson and N. L. Lapp*	109
5	Technique for repeated bile collection in the rat.	*E. E. Dean, R. E. Schuhmann, S. J. Tomlinson, and W. M. Tomlinson*	111
1, 8, 10	Implantation and stabilization of indwelling vascular catheters in the rabbit.	*M. Bazaral and R. N. Hamburger*	113
1, 8	Perfusion of the sinus node artery.	*R. J. Myerburg, J. W. Stewart, K. J. Vitikainen, and B. F. Hoffman*	115
1, 2, 6	Comparison of single-breath and indicator-dilution measurement of cardiac output.	*R. Gilbert and J. H. Auchincloss, Jr.*	119
1, 3	Measurement of intrarenal transit time and hemoglobin saturation by fiberoptics.	*W. N. Suki, M. L. Polanyi, D. Ostrowski, F. E. Walker, M. Martinez-Maldonado, and G. Eknoyan*	123
4	Gastric pepsin determinations: an automated method.	*J. Wenger and M. Sundy*	127
4	Water flux across the rat jejunum and ileum.	*E. Y. Berger, R. Pecikyan, and G. Kanzaki*	130
1	Application of impedance cardiography to study of postural stress.	*J. J. Smith, J. E. Bush, V. T. Wiedmeier, and F. E. Tristani*	133
5	A lung perfusion preparation for the study of drug metabolism.	*P. M. Rosenbloom and A. D. Bass*	138

XUM

No. 2. AUGUST 1970

SECTION			PAGE
1, 2, 8	Solubility of gases in human red blood cell ghosts.	*G. G. Power and H. Stegall*	145
6	Body temperature and oxygen uptake in warm- and cold-adapted rats during swimming.	*C. A. Dawson, R. B. Roemer, and S. M. Horvath*	150
5, 6	Plasma insulin concentrations during prolonged work at near maximal oxygen uptake.	*E. D. R. Pruett*	155
6, 7	Responses of the burro to desert heat stress.	*R. W. Bullard, D. B. Dill, and M. K. Yousef*	159
6	Muscle strength and lean body mass in old men of different physical activity.	*I. Kuta, J. Pařízková and J. Dýcka*	168
1, 2, 6	Lung volumes and apneic bradycardia in divers.	*S. K. Hong, T. O. Moore, G. Seto, H. K. Park, W. R. Hiatt, and E. M. Bernauer*	172
1, 6, 7	Circulatory impairment during exposure to ambient pressures of 4 mm Hg and 55 mm Hg.	*A. J. Pratt, H. L. Stone, H. F. Stegall, and W. C. Kaufman*	177
1	Stability studies on indocyanine green dye.	*J. Gathje, R. R. Steuer, and K. R. K. Nicholes*	181
2, 6	Maximal $\dot{V}_{O_2}$, ventilation, and heart rate of Olympic speed skating candidates.	*M. G. Maksud, R. L. Wiley, L. H. Hamilton, and B. Lockhart*	186
1, 6	Human peripheral rewarming during exercise in the cold.	*B. Hellstrøm, K. Berg, and F. Vogt Lorentzen*	191
5, 6	Energy cost of some common daily activities of active tropical male and female subjects.	*B. Banerjee and N. Saha*	200
1, 6	Estimation of heart stroke volume from blood hemoglobin and heart rate at submaximal exercise.	*R. Margaria, P. Cerretelli, and A. Veicsteinas*	204
1, 2, 6	Dynamics of ventilation and heart rate in response to sinusoidal work load in man.	*O. Wigertz*	208
9	Hypoglycemia and developmental changes in free amino acids of rat brain.	*J. M. Davis, W. A. Himwich, and V. C. Pederson*	219
1, 9	Mechanisms of cerebral vasodilatation in hypoxia.	*K. Kogure, P. Scheinberg, O. M. Reinmuth, M. Fujishima, and R. Busto*	223
2, 6	Contribution of pulmonary stores to oxygen uptake.	*J. H. Auchincloss, Jr., R. Gilbert, and G. H. Baule*	230
2, 11	Factors influencing pulmonary resistance.	*N. J. Vincent, R. Knudson, D. E. Leith, P. T. Macklem, and J. Mead*	236
1, 3	Renal hemodynamic response of unanesthetized dogs to positive acceleration.	*J. E. Chimoskey*	244

SPECIAL COMMUNICATIONS

1	Trichromatic ear densitometer for estimation of cardiac output using indocyanine green.	*P. Sekelj, K. R. Shankar, J. Doman, I. P. Sukumar, and W. H. Palmer*	249
3, 8	Construction of ion-selective glass electrodes by vacuum deposition of metals.	*J.-P. Guignard and S. M. Friedman*	254
2	Rapidly responding oxygen electrode for respiratory gas sampling.	*W. O. Friesen and M. B. McIlroy*	258
3	Total body water of the pig-tailed monkey, *Macaca nemestrina*.	*A. M. Kodama*	260
2, 5, 8	Minimal oxygen consumption in the female rat, some new definitions and measurements.	*W. D. Denckla*	263
1, 5, 8	A technique for prolonged infusion of unanesthetized and relatively unrestrained rats.	*J. S. Evans*	275

No. 3. SEPTEMBER 1970

6, 11	Elastic bounce of the body.	*G. A. Cavagna*	279
1, 2	Localization of recording site in the esophagus by means of cardiac artifacts.	*D. Trop, R. Peeters, and K. P. van de Woestijne*	283
1, 2, 6	Influence of body position on regional pulmonary arterial-venous shunts in intact dogs.	*R. Katori, D. deS. Amorim, R. A. Theye, and E. H. Wood*	288
2	Topography of pleural surface pressure above resting volume in relaxed animals.	*E. Agostoni, E. D'Angelo, and M. V. Bonanni*	297
5, 11	Distribution in muscle and liver vein protein of ^{15}N administered as ammonium acetate to man.	*P. Fürst, A. Jonsson, B. Josephson, and E. Vinnars*	307
5, 6	Validity of skinfold and girth assessment for predicting alterations in body composition.	*J. H. Wilmore, R. N. Girandola, and D. L. Moody*	313
1, 2	Reflex pulmonary vascular response to distention of lung vessel and left heart.	*T. C. Lloyd, Jr., and A. J. L. Schneider*	318
5, 6, 11	Hepatic and adrenal degradation of cholesterol during rest and muscular activity.	*M. R. Malinow, P. McLaughlin, A. Perley, L. Laastuen, and E. Van Hook*	323
2	Effect of respiratory pattern on alveolar gas exchange.	*J. H. Knelson, W. F. Howatt, and G. R. DeMuth*	328
2	Factors affecting trapped gas volume in perfused dog lungs.	*J. M. B. Hughes and D. Y. Rosenzweig*	332
2	Site of airway closure in excised dog lungs: histologic demonstration.	*J. M. B. Hughes, D. Y. Rosenzweig, and P. B. Kivitz*	340
6, 7	Shifts in body fluids during dehydration in the burro, *Equus asinus*.	*M. K. Yousef, D. B. Dill, and M. G. Mayes*	345
2, 6	Formation of whole number ratios of heart rate and breathing frequency.	*H. R. Weiss and J. Salzano*	350
5, 6, 11	Serum enzymes after marathon running.	*L. I. Rose, J. E. Bousser, and K. H. Cooper*	355

SECTION			PAGE
2, 6, 9	Electrical and metabolic activities and fatigue in human isometric contraction.	*E. Kuroda, V. Klissouras, and J. H. Milsum*	358
6	Venous blood distribution in the legs during intermittent treadmill work.	*C. Gisolfi and S. Robinson*	368
5, 6, 11	Effects of exercise on plasma lactic dehydrogenase isozymes and catecholamines.	*P. B. Raven, T. J. Connors, and E. Evonuk*	374
6, 9, 11	Behavior of a muscular group subjected to a sinusoidal and trapezoidal variation of force.	*A. Berthoz and S. Metral*	378
6, 9	Effects of preoptic cooling in rats acclimated to 21 and 4° C.	*M. Banet and J. J. Seguin*	385

SPECIAL COMMUNICATIONS

3	Discrepancy between experimental and theoretical urine-to-papilla osmotic gradients.	*L. Rabinowitz*	389
9	Angular and linear acceleration of a stereotaxically mounted cat.	*J. H. Licking, E. B. Kirsten, and S. M. Ross*	391
3, 9	Torque-free manipulator for concentric micropipets.	*H. Hall and L. C. Isaacson*	395
1, 3, 8	Precision electrostatic urine flowmeter.	*C. E. Constantinou and E. M. Briggs*	396
1, 2, 5	A continuous blood oxygen analyzer.	*M. Jellinek, H. B. Barner, and C. Kaiser*	398
1, 8, 11	High-fidelity recording of cardiac depolarization.	*G. J. Anderson, K. Greenspan, J. P. Bandura, and C. Fisch*	401
6, 8	A psychrometric chart for physiological research.	*A. B. Chambers*	406
2	Calibration and a correction of blood O_2 content measured by Po_2 after CO saturation.	*M. G. Behar and J. W. Severinghaus*	413
2	Measurement of O_2 content in microliter blood samples.	*H. Tazawa*	414

No. 4. OCTOBER 1970

6	Compensatory cardiovascular responses during an environmental cold stress, 5° C.	*P. B. Raven, I. Niki, T. E. Dahms, and S. M. Horvath*	417
2	Pressure-volume curves of air- and liquid-filled excised lungs—surface tension in situ.	*H. Bachofen, J. Hildebrandt, and M. Bachofen*	422
1, 2, 6	Distribution of pulmonary blood flow and ventilation during forward ($+G_x$) acceleration.	*D. H. Glaister*	432
1, 8	Dependence of oxygen consumption on circulation in normovolemic and hypovolemic dogs.	*D. F. J. Halmagyi and M. Kennedy*	440
2, 6, 8	Effects of hypoxia on voluntary response time to peripherally located visual stimuli.	*J. L. Kobrick and E. R. Dusek*	444
6	Serum electrolyte changes after marathon running.	*L. I. Rose, D. R. Carroll, S. L. Lowe, E. W. Peterson, and K. H. Cooper*	449
1, 6	Cardiovascular dimensions and moderate physical training in young men.	*M. H. Frick, A.-L. Sjögren, J. Peräsalo, and S. Pajunen*	452
1, 2, 6	Exercise at ambient and high oxygen pressure at high altitude and at sea level.	*K. Klausen, D. B. Dill, and S. M. Horvath*	456
2	Resistance to two-phase gas-liquid flow in airways.	*S. W. Clarke, J. G. Jones, and D. R. Oliver*	464
2, 9	Hyperbaric oxygen toxicity in newborn and developing mice.	*D. R. Sperling*	472
2	Effect of vagal blockade on regulation of breathing in conscious dogs.	*E. A. Phillipson, R. F. Hickey, C. R. Bainton, and J. A. Nadel*	475
2	Regional dispersion of volume-to-ventilation ratios in the lung of man.	*Y. Suda, C. J. Martin, and A. C. Young*	480
2	Stratified dead space in excised perfused lungs.	*D. J. Strieder, B. A. Barnes, B. W. Levine, and H. Kazemi*	486
2	Effect of food and water deprivation on surface activity of lungs of rats.	*E. E. Faridy*	493
1, 6	Effect of hypothalamic temperature waveforms on peripheral blood flow in the baboon.	*K. G. Kastella and A. C. Brown*	499

SPECIAL COMMUNICATIONS

6	A chronically implantable thermode for production of hypothalamic temperature waveforms.	*K. G. Kastella*	508
1	Generation of sinusoidal fluid pressures of relatively high frequency.	*J. E. K. Foreman and K. J. Hutchison*	511
1, 10	A direct photosensor technique to measure capillary blood cell motion.	*P. F. Stiller*	517
1, 2	A simple method for evaluation of cardiac output computers.	*R. J. Mills and F. Moran*	521
1, 3	A simple and rapid method for selectively altering plasma cation concentration.	*F. J. Haddy and J. B. Scott*	523
6, 11	Hand-held device to measure finger (thumb) strength.	*K. H. E. Kroemer and E. M. Gienapp*	526
1, 2	A mercury injection system for rapid anaerobic collection of small blood samples.	*H. B. Hechtman, R. E. Justice, and A. H. Herman*	528
2	Lung models: hollow, flexible reproductions.	*M. M. Eisman*	531
2	Error analysis of a recording system for measuring pulmonary pressure-volume curves.	*D. G. Frazer, R. A. Rhoades, and W. S. Adams*	534
1	A device for production of aortic insufficiency in intact experimental animals.	*D. A. Spring and G. G. Rowe*	538

XUM

SECTION PAGE

1 A real-time waveform analyzer for detection of ventricular premature beats.
M. D. Feezor, A. G. Wallace, and R. W. Stacy 541

No. 5. NOVEMBER 1970

6, 11 An analysis of O_2 debt contracted in submaximal exercise.
P. E. di Prampero, C. T. M. Davies, P. Cerretelli, and R. Margaria 547
6, 11 Effects on maximal oxygen intake of acute changes in altitude in a deep mine.
C. H. Wyndham, N. B. Strydom, A. J. van Rensburg, and G. G. Rogers 552
2, 6 Individual differences in critical temperatures among rats at various ages. *D. Blackmore* 556
6, 8 Blood glucose in high-altitude natives and during acclimatization to altitude.
E. Picon-Reategui, E. R. Buskirk, and P. T. Baker 560
1, 8 Effect of systemic and pulmonary venous hypertension on pleural and pericardial fluid accumulation.
R. B. Mellins, O. R. Levine, and A. P. Fishman 564
6 Energy cost of "hard work." *A. L. Hughes and R. F. Goldman* 570
3, 8, 10 Effects of red cell stroma-free hemoglobin solution on renal function in monkeys. *N. I. Birndorf and H. Lopas* 573
1, 8 Coronary collateral flow studies during variable aortic root pressure waveforms.
W. D. Gundel, B. G. Brown, and V. L. Gott 579
2 Factors influencing function of the autotransplanted lung.
J. S. Brody, A. B. Fisher, C. D. Park, R. W. Hyde, and J. A. Waldhausen 587
1, 2 Solubility of nitrous oxide in biologic fluids and myocardium.
R. L. Kozam, S. M. Landau, J. M. Cubina, and D. S. Lukas 593
6, 11 Lactate, ATP, and CP in working muscles during exhaustive exercise in man. *J. Karlsson and B. Saltin* 598
1, 6, 8 Sensitivity to central and peripheral thermal stimulation in man.
E. R. Nadel, S. M. Horvath, C. A. Dawson, and A. Tucker 603
6, 11 Effect of muscular activity on bile acid excretion in rats. *M. R. Malinow, P. McLaughlin, A. Perley, and L. Laastuen* 610
2 Increased atelectatic pulmonary shunt during hemorrhagic shock in dogs.
E. A. Wahrenbrock, C. J. Carrico, D. A. Amundsen, M. J. Trummer, and J. W. Severinghaus 615
5, 6 Acute effects of cold on blood levels of growth hormone, cortisol, and thyrotropin in man.
J. Golstein-Golaire, L. Vanhaelst, O. D. Bruno, R. Leclercq, and G. Copinschi 622
1, 7 Reduction of reactive hyperemia in the human forearm by face immersion. *R. Elsner and B. A. Gooden* 627
1, 2, 6 Pulmonary pressure-volume changes attending head injury. *D. L. Beckman and J. W. Bean* 631
1, 11 Peak measured velocity of shortening in the canine left ventricle. *H. Mehmel, H. P. Krayenbuehl, and W. Rutishauser* 637
2 In vivo visualization of small airway constriction after pulmonary microembolism in cats and dogs.
S. W. Clarke, P. D. Graf, and J. A. Nadel 646
6, 11 Oxygen debt after submaximal physical exercise. *H. G. Knuttgen* 651
1, 6 Role of air temperature and wind in the time necessary for a finger to freeze. *O. Wilson and R. F. Goldman* 658
1, 8, 9 Effects of general anesthesia on autoregulation of cerebral blood flow in man.
A. L. Smith, J. L. Neigh, J. C. Hoffman, and H. Wollman 665
1, 2, 10 Autologous pulmonary embolism in the intact, unanesthetized dog. *C. M. Bloor, B. E. Sobel, and P. D. Henry* 670
6, 9 Effects of heating and cooling of the spinal cord on preoptic unit activity. *J. D. Guieu and J. D. Hardy* 675
5, 8 Effect of cycloheximide on production of diamine oxidase by the human placenta.
A. L. Southren, A. M. Calanog, S. Mishr, and A. B. Weingold 684
3, 6 Effects of water intake on composition of thermal sweat in normal human volunteers.
G. Cage, S. Wolfe, R. Thompson, and R. Gordon 687
6 Mobilization of energy sources in exercising dogs. *B. Issekutz, Jr., A. C. Issekutz, and D. Nash* 691
1, 6 Brain temperature and cutaneous blood flow in the anesthetized pig. *D. L. Ingram and R. El. Smith* 698
2 Vertical gradient of transpulmonary pressure with active and artificial lung expansion. *E. Agostoni and G. Miserocchi* 705

SPECIAL COMMUNICATIONS

1 An indirect method for determination of tissue:blood partition coefficient for xenon 133. *C. Rosendorff and R. H. Luff* 713
1 Determination of valvular pressure gradients by visual comparison of areas. *C. Potanin, D. Jackson, and J. Burdeshaw* 717
2, 6 Design of a small-animal pneumotachograph. *L. Diamond and W. Lipscomb* 720
10 Polyvinyl alcohol–heparin hydrogen "G."
E. W. Merrill, E. W. Salzman, P. S. L. Wong, T. P. Ashford, A. H. Brown, and W. G. Austen 723
2, 5 Apparatus measuring oxygen consumption and expired CO_2 and $^{14}CO_2$ in small subjects.
J. Gentz, B. Persson, J. Hakkarainen, and S. Lindstedt 731
10 Effect of anticoagulants on human plasma colloid osmotic pressure measurements. *A. T. Marty and M. Intaglietta* 740
1, 11 A method for measurement of dynamic compliance of the left ventricle in dogs.
G. H. Templeton, J. H. Mitchell, R. R. Ecker, and G. Blomqvist 742
6, 7, 9 Variable-temperature nerve chamber. *J. R. Meyer and J. P. Hegmann* 746
1, 8, 11 An electrooptical monitoring technique for heart cells in tissue culture. *A. J. Sinclair, H. A. Miller, and D. C. Harrison* 747

SECTION			PAGE
6, 8	Theory of the globe thermometer.	*L. A. Kuehn, R. A. Stubbs, and R. S. Weaver*	750
2, 8	A simple reliable membrane oxygenator for organ perfusion.	*R. H. Bartlett, B. S. Noyes, and P. A. Drinker*	758

No. 6. DECEMBER 1970

6	Central and peripheral stimuli regulating sweating during intermittent work in men.	*C. Gisolfi and S. Robinson*	761
1	Coronary and systemic hemodynamic effects of glucagon in the intact unanesthetized dog.	*R. J. Bache, P. A. McHale, C. L. Curry, J. A. Alexander, and J. C. Greenfield, Jr.*	769
2	Total respiratory compliance in infants and children.	*J. T. Sharp, W. S. Druz, R. C. Balagot, V. R. Bandelin, and J. Danon*	775
2	Mechanism of compliance change in excised rat lung.	*S. Young, D. Tierney, and J. Clements*	780
2	Bilateral lung lavage with hyperbarically oxygenated saline.	*G. D. Blenkarn and J. A. Hayes*	786
1, 6, 11	Instantaneous cardiac acceleration in man induced by a voluntary muscle contraction.	*J. K. Petro, A. P. Hollander, and L. N. Bouman*	794
1, 6	Heart rates during 24 hours of usual activity.	*S. Glagov, D. A. Rowley, D. B. Cramer, and R. G. Page*	799
4, 8	Absorption of bile salts from human gastric mucosa.	*K. J. Ivey, L. DenBesten, and S. Bell*	806
5, 6, 11	FFA mobilization during and after prolonged severe muscular work in men.	*E. D. R. Pruett*	809
1, 2	Reduction of blood volume by voluntary hyperventilation.	*P. W. Straub and A. A. Bühlmann*	816
1, 6	Central circulation during submaximal work preceded by heavy exercise.	*L. H. Hartley, B. Pernow, J. Hoggendal, J. Lacour, J. de Lattre, and B. Saltin*	818
5, 6, 8	Diurnal patterns of rats determined by calorimetry under controlled conditions.	*W. W. Lackey, L. A. Broome, J. A. Goetting, and D. A. Vaughan*	824
6	Direct evaluation of convective heat transfer coefficient by naphthalene sublimation.	*Y. Nishi and A. P. Gagge*	830
1, 2	Restoration of systemic blood flow to the lung after division of bronchial arteries.	*A. B. Fisher, H. Kollmeier, J. S. Brody, R. W. Hyde, J. Hansell, J. N. Friedman, and J. A. Waldhausen*	839
2, 6	Exhausting work limited by external resistance and inhalation of carbon dioxide.	*F. N. Craig, W. V. Blevins, and E. G. Cummings*	847
2, 6, 8	Temperature regulation of the unanesthetized cat during mild cold and severe heat stress.	*T. Adams, M. L. Morgan, W. S. Hunter, and K. R. Holmes*	852
6, 8	Thermal response of human legs during cooling.	*J. W. Mitchell, T. L. Galvez, J. Hengle, G. E. Myers, and K. L. Siebecker*	859
1, 2, 10	Relative viscosity of blood at varying hematocrits in pulmonary circulation.	*J. B. Agarwal, R. Paltoo, and W. H. Palmer*	866
2, 6	Tidal volume and respiratory rate changes at start and end of exercise.	*W. L. Beaver and K. Wasserman*	872
1	Measurement of canine left ventricular performance by cineradiography of the heart.	*A. A. Bove and P. R. Lynch*	877

SPECIAL COMMUNICATIONS

1, 11	Radiographic determination of force-velocity-length relationship in the intact dog heart.	*A. A. Bove and P. R. Lynch*	884
1	Remote switching with latching to selected sites of variable-frequency cardiac pacing.	*E. J. Reininger and E. J. Hinchey*	889
1, 8	Recording of contractile activity of cells in culture.	*O. F. Schanne*	892
1, 8	Digital monitoring of cardiac transmembrane potential characteristics.	*H. Gelband, R. J. Myerburg, S. M. Ross, and B. F. Hoffman*	894
1, 2, 6	Rebreathing measurements of pulmonary diffusing capacity for CO during exercise.	*W. H. Lawson, Jr.*	896
1, 8	FM converter for tape recording of low-frequency biological data.	*W. M. Caldwell, M. E. Whiting, and A. B. Judy*	901
1	Estimation of pressure gradient by differential pressure.	*R. H. Cox*	904
1	Simultaneous comparison and calibration of the Doppler and electromagnetic flowmeters.	*S. F. Vatner, D. Franklin, and R. L. VanCitters*	907
1	Catheter-flush system for continuous monitoring of central arterial pulse waveform.	*R. M. Gardner, H. R. Warner, A. F. Toronto, and W. D. Gaisford*	911
6	Report barometric pressure!	*D. B. Dill and D. S. Evans*	914
1, 9	Hybrid computer programming of study of cardiac excitation.	*P. J. Martin*	917

CORRIGENDUM

Volume 28, June 1970

Page 840: T. R. Harris and E. V. Newman. "An analysis of mathematical models of circulatory indicator-dilution curves." Dr. W. A. Conrad has pointed out to the authors an algebraic error in the presentation of his model (Conrad, W. A., R. W. Broncato, and C. A. Pallini. Indicator dilution considered as the delayed pulse responses of an overdamped resonant circuit. *J. Appl. Phys.* 36: 861–863, 1965) in the APPENDIX of this paper. The quantity M should be M/V_1 in *equations A14, A15, A16, A19,* and *A22.* This requires a reformulation of the equivalences between this model and the general model.

XUM

In this case the equivalences of Table 1 should be

$$\frac{F}{V_1} = \frac{R}{2L} + \left(\left(\frac{R}{2L}\right)^2 - \frac{Q}{L}\right)^{1/2}$$

$$\frac{F}{V_2} = \frac{R}{2L} - \left(\left(\frac{R}{2L}\right)^2 - \frac{Q}{L}\right)^{1/2}$$

In addition several sign inversions occurred in *equations A19, A20,* and *A21.* The equations should read:

$$f(t) = \frac{M}{F\theta}\left\{1 + \left(\frac{\tilde{a}^2 - \xi^2}{2\xi}\right)\left[\frac{e^{-(\tilde{a}+\xi)t}}{\tilde{a}+\xi} - \frac{e^{-(\tilde{a}-\xi)t}}{\tilde{a}-\xi}\right]\right\} \quad (A19)$$

$$\tilde{a} = \frac{(V_2 + V_1)F}{2V_1 V_2} \quad (A20)$$

$$\xi = \left[\left(\frac{V_2 + V_1}{2}\right)^2 \left(\frac{F}{V_1 V_2}\right)^2 - \frac{F^2}{V_1 V_2}\right]^{1/2} \quad (A21)$$